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ABSTRACT

This annotated bibliography suggests a selection of books that provide sources of information and recreational reading. It is divided into sections for primary, intermediate, and junior high school levels. Most of the books suggested for primary children are those from the general literature that give special attention to mathematical ideas; books listed for intermediate and junior high students are devoted to science and mathematics and related topics. A directory of publishers is provided. A related document is SE 016 104. (See ED 034 677 for an earlier edition of this publication.) (Author/DT)

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ELEMENTARY and JUNIOR HIGH SCHOOL

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Foreword

Growth in the ability to think with the ideas of mathematics requires a wide variety of experiences. Reading, one of the most rewarding of these experiences, helps with the understanding of ideas and also stimulates further interest and activity on the part of the learner. Books in a school library may enrich the mathematics program by providing such a stimulus for students.

This bibliography suggests to teachers and librarians a selection of books that may serve to enrich the instructional program by providing sources of information and recreational reading. It consists of sections for primary, intermediate, and junior high school students. Most of the books suggested for primary children are those from the general literature that give special attention to mathematical ideas. Books listed in the sections for intermediate and junior high school students are largely devoted to science and mathematics and related topics.

The grade-placement suggestions are simply recommendations; teachers may want to make adaptations to fit the needs of their own classes. In some cases a book covers a great enough range to be useful in both primary and intermediate grades or intermediate and junior high school grades. When a book is listed twice, the reader is referred in the second listing to the page of initial listing for publication data and annotation.

The present pamphlet is an outgrowth and an updating of the following bibliographies:

Hutcheson, Ruth; Mamer, Edna; and Holmberg, Marjorie B. "The Elementary School Mathematics Library: A Selected Bibliography," *The Arithmetic Teacher*, III (February 1956), 8-16.

Hess, Adrien L. "A Bibliography of Mathematics Books for Elementary School Libraries," *The Arithmetic Teacher*, IV (February 1957), 15-20.

Hess, Adrien L. "Bibliography of Books for Enrichment in Arithmetic," *The Arithmetic Teacher*, VI (February 1959), 12-16.

Hardgrove, Clarence Ethel; Cole, Mildred; and Gustafson, Anne. *Thinking in the Language of Mathematics*. Bulletin No. C-2. Springfield, Ill.: Illinois Curriculum Program, 1959. Pp. 121-26.

Hardgrove, Clarence Ethel. *The Elementary and Junior High School Mathematics Library*. Washington, D.C.: The National Council of Teachers of Mathematics, 1960.

Hardgrove, Clarence Ethel, and Miller, Herbert F. *Mathematics Library–Elementary and Junior High School*. Washington, D.C.: The National Council of Teachers of Mathematics, 1968.

We express our appreciation for the help of many librarians of both public and school libraries in locating appropriate materials, as well as to those publishers who provided their publications for consideration and who provided current data on prices, edition dates, and other changes for items listed in previous editions of this bibliography.

De Kalb Illinois — C.E.H.
August, 1972 — H.F.M.

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Note to the Reader

For references to more advanced materials, see the companion bibliography, *The High School Mathematics Library* (fifth edition, 1973).

Primary Grades

Abbott, Janet S. *Learn to Fold—Fold to Learn.* Franklin Mathematics Series. Franklin, 1968, 120 pp., $1.80, paper. Grades 3-4.

An excellent workbook, do-it-yourself type. Supplementary material that helps the reader investigate, by use of paper folding, these geometric ideas, among others: point, line segment, line, horizontal and vertical lines, parallel lines, circle, triangle, rectangle, square, and congruent figures.

_____. *Mirror Magic.* The Franklin Mathematics Series. Franklin, 1968, 120 pp., $2.10, paper. Grades 3-5.

An excellent workbook, do-it-yourself type. Supplementary material that helps the reader investigate the concept of reflexive symmetry.

Adams, Roz. *Do You Know What Time It Is?* Illustrated by Boche Kaplan. Prentice, 1968, 32 pp., $4.50. Grades K-3.

Simple instructions for telling time from clock faces and for making a paper-plate clock face.

Adams, Pamela. *The First Book of Number Rhymes,* Watts, 1970, unpaged, $1.49. Grades K-1.

A collection of illustrated rhymes which use number words.

Adler, Irving, and Ruth Adler. *The Calendar.* Day, 1967, 48 pp., $2.68. Grades 3-6.

A discussion of what a calendar is, why we need calendars, and the history of important changes in calendar organization.

_____. *Sets.* Day, 1967, 48 pp., $2.68. Grades 3-6.

An excellent introduction, with exercises, to the ideas of naming sets, forming subsets, finding solution sets for simple equations, forming unions and intersections of sets, and finding the number of a set.

———. *Sets and Numbers for the Very Young.* Illustrated by Peggy Adler Walsh. Day, 1969, 48 pp., $3.98. Grades 1-2.

A picture workbook for teaching cardinals and ordinals from one to ten, the form of the numerals, and the meaning of "more" and "fewer."

Allen, Robert. *Numbers—a First Counting Book.* Photographs by Mottke Weissman. Platt, 1968, unpaged, $2.50. Grades K-1.

The numerals 1 to 10 are first introduced with sets of objects in photographs. Other photographs and text provide experiences in counting, comparison, conservation, and a few simple addition facts.

Ambler, C. Gifford. *Ten Little Foxhounds.* Childrens, 1968, 32 pp., $2.06. Grades K-1.

Story in rhyme similar to "Ten Little Indians."

Babbitt, Samuel. *The Forty-ninth Magician.* Illustrated by Natalie Babbitt. Pantheon, 1966, unpaged, $3.29. Grades 1-3.

A fantasy relating cardinal and ordinal names. A king, forced to choose among his forty-nine magicians, chooses the one who can make hours seem like minutes.

Baer, Howard. *Near This, Near That.* Holiday, 1957, unpaged, $2.25. Grades 1-3.

Encourages children to look at things from different distances and different angles as they develop such comparative vocabulary as *big, little, up, down, taller, straight, under, on, far,* and *near.*

Baker, Marybob. *The Smiley Lion Book.* Illustrated by J. P. Miller. Golden, 1964, unpaged, $1.69. Grades K-1.

A counting book that uses names and numerals for the numbers one through ten.

Barr, Cathrine. *99 Ducks plus 1.* Walck, 1969, 32 pp., $3.75. Grades K-2.

Story through text and pictures develops numbers to about one hundred.

———. *Seven Chicks Missing.* Walck, 1962, 32 pp., $3.75. Grades K-2.

Simple easy-to-read text and pictures that use ideas of seven through one.

Barr, Donald. *Arithmetic for Billy Goats.* Illustrated by Don Madden. Harcourt, 1966, 108 pp., $3.50. Grades 3-6.

A fantasy of how arithmetic with base-two numerals might have been invented.

Behn, Harry. *All Kinds of Time.* Harcourt, 1950, 64 pp., $3.00. Grades 1-4.

A poetic and fanciful picture book about clocks, time, and the seasons.

Beim, Jerrold. *The Smallest Boy in the Class.* Morrow, 1949, 47 pp., $3.78. Grades 1-3.

The antics of the smallest boy in the class, used to develop the ideas of comparison such as big, biggest, small, smallest, tiny, tall, and tallest.

Bendick, Jeanne. *All around You.* McGraw, 1951, 48 pp., $3.67. Grades K-4.

Describes in simple pictures and with the vocabulary of comparison, number, and measurement the why and how of the world about us. Among the many topics considered are shadows, clouds, fog and rain, the year, soil, seeds, and insects.

_____. *Shapes.* Illustrated by the author. Watts, 1968, 70 pp., $3.65. Grades 3-6.

Plane and solid geometric figures, called shapes by the author, are introduced through pictures and text, first as a general idea and then as specific figures.

_____. *Space and Time.* Illustrated by the author. Watts, 1968, 66 pp., $2.65. Grades 2-4.

Questions and answers to the questions help children think about space and time and how these are measured.

Berkley, Ethel S. *Ups and Downs: A First Book about Space.* Illustrated by Kathleen Elgin. Hale, 1951, unpaged, $2.75. Grades 1-2.

Pictures and text help develop concepts of up, down, high, low, bottom, top, under, and over.

Bianco, Pamela. *The Doll in the Window.* Walck, 1953, 32 pp., $4.25. Grades 1-2.

A little girl who saved her pennies to buy Christmas presents for her five sisters uses ideas of value and comparison in planning her purchases.

Bishop, Claire Huchet. *Twenty-two Bears.* Illustrated by Kurt Wiese. Viking, 1964, 31 pp., $3.37. Grades K-2.

Uses each of the numbers one through twenty-two in the story of a dream about bears.

Bishop, Claire Huchet, and Kurt Wiese. *The Five Chinese Brothers.* Coward, 1938, 44 pp., $3.64. Grades 1-3.

The ordinal-number ideas one through five developed.

Blair, Mary. *The Up and Down Book.* Golden, 1964, unpaged, $1.00. Grades K-1.

A picture book that contrasts "up" and "down."

Bhough, Glenn O. *Wait for the Sunshine.* Illustrated by Jeanne Bendick. McGraw, 1954, 47 pp., $3.83. Grades 1-4.

This story of seasons and growing things utilizes many ideas of measurement and comparison as well as number ideas.

Brandenberg, Franz. *I Once Knew a Man.* Pictures by Aliki. Macmillan, 1970, unpaged, $3.95. Grades K-2.

Clever story told with few words and simple pictures. The numbers zero through seven are used repeatedly.

Brandes, Franklyn M. *Big Tracks, Little Tracks.* Illustrated by Leonard Kessler. Crowell, 1960, unpaged, $3.75. Grades 1-2.

Cleverly illustrated book about the tracks made by people, their household pets, and other animals. Relates size of the tracks to the size of their makers.

_____. *North, South, East, and West.* Illustrated by Robert Galster. Crowell, 1966, unpaged, $3.75. Grades 2-4.

Easy text develops language of position in an effective way.

Brenner, Barbara. *Mr. Tall and Mrs. Small.* Scott, 1966, 32 pp., $3.75. Grades K-2.

The story of a giraffe and a mouse who argue about the advantages of tallness and smallness.

Carle, Eric. *1, 2, 3 to the Zoo.* World, 1968, 32 pp., $3.21. Grades K-1.

Picture book without text showing sets of animals on flatcars bound for the zoo. Numerals from 1 to 10 are included.

Chalmers, Audrey. *Hundreds and Hundreds of Pancakes.* Viking, 1941, 38 pp., $3.19. Grades K-2.

The concept of hundreds as many is developed as a family of six deals with hundreds of pancakes. Also conveyed are ideas of size, position, comparison, and measurement.

Cotcos, Lucille. *Joel Spends His Money.* Abelard, 1954, 40 pp., $2.75. Grades 2-3.

The value of money and ideas of saving and spending are illustrated as Joel learns how best to use his allowance.

Craig, M. Jean. *Boxes*. Pictures by Joe Lasker. Norton, 1964, unpaged, $3.95. Grades K-1.

Ideas of size and shape are introduced through text and pictures of boxes.

Crews, Donald. *Ten Black Dots*. Scribner, 1968, unpaged, $3.44. Grades K-1.

A counting book (one to ten) relating both numerals and words to the number of black dots used in interesting designs.

D'Aulaire, Ingri, and Edgar Parin D'Aulaire. *Don't Count Your Chicks*. Doubleday, 1943, 40 pp., $4.95. Grades K-3.

An old lady counts eggs and money and makes use of the one-to-one correspondence idea while she dreams of more chickens, more eggs, and more money.

Dennis, J. Richard. *Fractions and Parts of Things*. Illustrated by Donald Crews. A Young Math Book. Crowell, 1971, 33 pp., $3.75. Grades 3-6.

Description and drawings of parts of geometric figures are used to develop these ideas: one half, one third, two thirds, one fourth, three fourths, one half of two thirds, and one third of three fourths. The text, which asks questions and suggests activities, is best used with the guidance of a teacher.

Downer, Marion. *Discovering Design*. Lothrop, 1947 104 pp., $3.50. Grades 3-6.

Descriptions and photographs or drawings of various types of design, classified in such ways as symmetric, geometric, line, and balanced.

Duvoisin, Roger Antoine. *Two Lonely Ducks*. Knopf, 1955, 40 pp., $4.19. Grades K-1.

Cardinal and ordinal numbers in word and symbol appear many times in this story of two ducks and their ten ducklings.

Editors of Doubleday. *One, Two, Buckle My Shoe*. Illustrated by Gail Hales. Doubleday, 1964, 63 pp., $3.25. Grades K-1.

A collection of modern and ancient counting rhymes. Cleverly illustrated.

Elkin, Benjamin. *Six Foolish Fishermen*. Illustrated by Katherine Evans. Childrens, 1957, unpaged, $3.50. Grades K-3.

Cardinal and ordinal numbers from one through six are employed in telling about six brothers who went fishing. Each fisherman tries to find his sixth brother.

———. *The True Book of Money.* Illustrated by Mary Gehr. Children's, 1960, 48 pp., $2.81. Grades 1-4.

A factual book about barter and about the development of present-day money and its uses.

Emberly, Ed. *The Wing on a Flea—a Book about Shapes.* Illustrated by the author. Little, 1961, 48 pp., $3.95. Grades K-2.

A beautifully illustrated story about objects that show triangular, rectangular, and circular shapes.

Federico, Helen. *The Golden Happy Book of Numbers.* Golden, 1963, unpaged, $2.19. Grades K-1.

Many sets of objects illustrate the use of the numbers one through ten.

Fehr, Howard F. *Five Is 5.* See Little Owl Books. Grades K-2.

Introduces many different pictures of sets of five members and numerals for five.

———. *If You Can Count to Ten.* See Young Owl Books. Grades 2-4.

Attractive pictures of objects inscribed with numbers.

———. *This Is My Family.* See Little Owl Books. Grades K-2.

Pictures and description of a family and some of its subsets.

Fisher, Margery M. *One and One.* Illustrated by Leonard Everett Fisher. Dial, 1963, unpaged, $2.95. Grades K-2.

Pictures and text designed to help children learn to count to ten and to learn the addition facts with sums of ten or less.

Fogel, Barbara R. *What's the Biggest?* Illustrated by Barbara Wolff. Random, 1966, $3.50. Grades 3-6.

Explores the meaning and measurement of size of man-made things and of living things. The record-holders for size among specific things such as animals, buildings, bridges, tunnels, dams, telescopes, cities, mountains, caves, waterfalls, planets, and stars are given. A bibliography and index are included.

Ford, Henry W. *Fun with the Calendar.* See Young Owl Books. Grades 2-4.

Information about year, months, days of a year, weeks, and days of a month presented in an interesting way. Most pages end with questions.

Françoise. *What Time Is It, Jeanne-Marie?* Scribners, 1968, unpaged, $3.95. Grades K-2.

A clockface and brief text correlate times of day to various events in Jeanne-Marie's day.

Frédérique and Papa [Frédérique Papa and Georges Papa]. *Graph Games.* Illustrated by Susan Hobling. A Young Math Book. Crowell, 1971, 33 pp., $3.75. Grades 3-5.

An easy-to-read, well-illustrated book. Introduces informally the following mathematical ideas through the use of an interesting game: well-defined set, several different kinds of relations, range and domain, one-to-one correspondence, and many-to-one correspondence.

Fricker, Margaret. *Chicken Little, Count-to-Ten.* Childrens, 1946, 28 pp., $3.50. Grades 1-2.

Chicken Little meets animals in groups of one through ten and identifies the number in each group.

Fricker, Margaret, ed. *About Measurement.* Based on "A History of Mathematics," Ford Motor Company. Childrens, 1965, 31 pp., $3.00. Grades 3-6.

A simply written and illustrated story about the history of units of length—cubit, foot, inch, fathom, yard, rod, furlong, meter, and light-year.

Froman, Robert. *Bigger and Smaller.* Illustrated by Gosta Franmenghi. A Young Math Book. Crowell, 1971, 33 pp., $3.75. Grades 3-5.

Through description and pictures of objects, the reader is asked to make decisions about whether an object is big or small in relation to other objects and to understand that relative size may involve only one of several aspects such as height or weight.

_____. *Faster and Faster, a Book about Speed.* Illustrated by Arnold Spilka. Viking, 1965, 45 pp., $3.00. Grades 3-5.

An imaginative comparison of the speed of snails, turtles, people, horses, fish, cheetahs, birds, boats, automobiles, airplanes, the wind, sound, the earth, spacecraft, light waves, and radio waves.

Gag, Wanda. *Millions of Cats.* Coward, 1938, 30 pp., $3.29. Grades K-2.

The story of an old man's quest to find a cat for his wife provides children with readiness experience for large numbers.

Gaso, Margaret. *Three Presents for Jamie.* Childrens, 1969, unpaged, $3.00. Grades K-3.

A story that uses repeatedly the idea of three.

Geisel, T. S. See Seuss, Dr.

Grant, Eldon. *Twenty White Horses.* See Young Owl Books. Grades 2-4.

Set of twenty horses used to show need for division.

Greenhood, David. *Watch the Tides.* Illustrated by Jane Castle. Holiday, 1961, unpaged, $3.95. Grades 1-3.

This beautifully written science book about the oceans and their behavior helps in the development of the language of comparison.

Gregor, Arthur. *1, 2, 3, 4, 5.* Photographs by Robert Doisneau. Lippincott, 1956, unpaged, $3.50. Grades K-1.

A picture book for numbers from one to twelve.

Hall, William. *Captain Murphy's Tugboats.* See Little Owl Books. Grades K-2.

Counting and addition of ones.

Hart, Jane. *Let's Think about Time.* Illustrated by Judy Varga. Hart, 1965, 32 pp., $2.95. Grades 1-3.

Thinking of the time that it takes to do everyday things helps to develop the ideas of second, minute, hour, day, month, and year. Also discussed are morning, noon, afternoon, evening, night, and the seasons of the year. Well illustrated with simply written text.

Hengesbaugh, Jane. *I Live in So Many Places.* Illustrated by Katherine Evans. Childrens, 1956, unpaged, $3.00. Grades 1-3.

Relative position is developed by a child who tells of living in a house on a street in a county in a state of the United States on the North American continent in the Western Hemisphere on the earth,a part of the universe.

Highland, Esther Harris, and Harold Joseph Highland. *The How and Why Wonder Book of Mathematics.* Illustrated by Walter Ferguson. Grosset, 1961, 48 pp., $2.19. Grades 2-6.

A very, very brief overview of some mathematical topics such as numbers, numerals, history of mathematics, probability, and topology.

Holton, Lana. *Count and See.* Macmillan, 1972, unpaged, $4.95. Grades K-1.

A series of excellent photographs of common things to count. The number of things (1-15, 20, 30, 40, 50, 100) in a photograph is also shown by word, numeral, and a set of dots.

Hoberman, Mary Ann, and Norman Hoberman. *All My Shoes Come in Twos.* Little, 1957, 48 pp., $3.95. Grades 1-3.

A story in rhyme tells about all kinds of shoes and uses the idea of two over and over again.

Hogan, Inez. *Twin Lambs.* Dutton, 1951, 44 pp., $2.92. Grades K-2.

The story of twin lambs who wander away from their flock develops the ideas of same size, same shape, together, and distance.

Horne, Sylvia. *Learning about Measurement.* Franklin Mathematics Series. Franklin, 1968, 104 pp., $3.60. Grades 3-4.

Excellent do-it-yourself investigations of a self-directed type that will help the reader understand measurement of length, area, volume, liquid and dry measure, weight, time, temperature, speed, and money.

Hughes, Peter. *The Emperor's Oblong Pancake.* Abelard, 1962, unpaged, $2.95. Grades 1-3.

Delightful story of a king's discovery as a result of trying to change everything including the sun into the shape of an "oblong." Language includes ordinal number and comparison of size and shape.

Hutchins, Pat. *Clocks and More Clocks.* Macmillan, 1970, unpaged, $4.95. Grades K-2.

An interesting story about several clocks in a house. The story helps children understand time and the telling of time.

Ipcar, Dahlov. *Brown Cow Farm.* Doubleday, 1959, unpaged, $3.50. Grades K-2.

A book that counts the animals (1-100) on a farm in winter and spring. Excellent text and illustrations.

_____. *Ten Big Farms.* Knopf, 1957, unpaged, $4.59. Grades K-3.

The ordinal numbers from one to ten are developed in this interesting story of a city family that sets out to buy a farm.

Jacobs, Leland B., compiler. *Delight in Number.* See Young Owl Books. Grades 2-4.

Collection of poems using number.

Jonas, Arthur. *Archimedes and His Wonderful Discoveries.* Illustrated by Aliki. Prentice, 1963, 71 pp., $3.75. Grades 3-6.

A discussion of several discoveries of Archimedes or discoveries attributed to him. Sources are cited in a final biographical chapter.

_____. *More New Ways in Math.* Prentice, 1964, 72 pp., $3.75. Grades 3-7.

Discussion of cardinality; ordinality; number symbolism; true, false, and open sentences; identities; and the uses of the number line.

Jordan, Helene J. *How a Seed Grows.* Illustrated by Joseph Low. Crowell, 1960, unpaged, $3.75. Grades K-1.

Illustrates use of numerals to keep an account of a series of events.

Kaufman, Joe. *Big and Little.* Golden, 1966, unpaged, $2.39. Grades K-2.

Pictures and simple text for comparisons of large and small objects.

Kay, Helen. *One Mitten Lewis.* Illustrated by Kurt Werth. Lothrop, 1955, unpaged, $3.95. Grades 1-3.

This humorous story about a little boy who is always losing one mitten frequently employs the words *pair, both, one, each, first,* and *next.*

Keith, Eros. *A Small Lot.* Bradbury, 1968, 32 pp., $4.25. Grades K-2.

Story with pictures about two boys whose made-up games are suggested by passersby who reject the use of a lot for various businesses because it is so small.

Kessler, Leonard. *I Made a Line.* Grosset, 1962, 61 pp., $0.59. Grades 1-3.

Some language of position and of geometry used as a boy thinks about his drawings of a line.

Kettelkamp, Larry. *Kites.* Morrow, 1959, 48 pp., $2.75. Grades 3-7.

A description of kites and kite-building projects making use of language of measurement and geometry.

_____. *Puzzle Patterns.* Morrow, 1963, 48 pp., $3.14. Grades 3-6.

A book of puzzles of several types. The chapter on geometric puzzles is the most mathematical and requires that models be cut apart and rearranged. The ancient Chinese tangram is included.

Keyser, Sarah. *Numbers Are Things.* Platt, 1971, unpaged, $3.50. Grades K-2.

A counting book (1-10) with a series of clear, dual-exposure pictures, corresponding numerals, and clever rhymes for each.

Klein, Leonore. *How Old Is Old?* Illustrated by Leonard Kessler. Harvey, 1967, 45 pp., $3.36. Grades 1-3.

Text and pictures help children understand the relativeness of age. The question "Is it old?" is answered for such things as children, mayflies, mice, trees, horses, fathers, grandmothers, tortoises, and the earth.

———. *Just a Minute.* Illustrated by Leonard Kessler. Harvey, 1969, 48 pp., $3.36. Grades 2-5.

Uses everyday experiences of children to help them understand the relationship of seconds, minutes, hours, days, weeks, months, and years.

———. *What Is an Inch?* Illustrated by Leonard Kessler. Harvey, 1966, 48 pp., $3.36. Grades 3-6.

Easy text and interesting sketches develop ideas of these units of measure and their interrelation—inch, foot, yard, mile; square inch, square foot, square yard; cubic inch, cubic foot, cubic yard; kilometer, meter, centimeter, millimeter, micron, millimicron; digit, hand, cubit. The author sometimes sacrifices good mathematical language to make interesting text.

Kohn, Bernice. *Everything Has a Shape and Everything Has a Size.* Prentice, 1966, unpaged, $4.50. Grades 1-2.

Introduction through simple description and pictures to some geometric ideas such as circle, disk, round, cone, and cylinder.

Krasilovsky, Phyllis. *The Very Little Boy.* Illustrated by Ninon. Doubleday, 1962, unpaged, $3.50. Grades K-1.

Language of comparison used in this story of a very little boy as he grows into a bigger boy.

———. *The Very Little Girl.* Illustrated by Ninon. Doubleday, 1953, unpaged, $3.50. Grades K-1.

Size is illustrated as a little girl who is smaller than a rose bush or a kitchen stool grows until she can reach a door handle, eat at a big table, and be a big sister.

Krauss, Ruth. *The Growing Story.* Illustrated by Phyllis Rowland. Harper, 1947, 32 pp., $3.79. Grades K-2.

A little boy watches the flowers and animals grow all summer and discovers that he, too, has grown. Concepts of comparison and quantity are used.

Kruss, James. *3 × 3. Three by Three.* Illustrated by Eva Rubin. Macmillan, 1965, unpaged, $3.95. Grade K.

A read-aloud picture book about sets of three animals and other objects. Simple story with bold, charming illustrations.

Lauber, Patricia. *The Story of Numbers.* Illustrated by Mircea Vasiliu. Random, 1961, 96 pp., $3.47. Grades 3-5.

An easy-to-read story of a probable history of number and of the invention of numerals.

Leaf, Munro. *Arithmetic Can Be Fun.* Lippincott, 1949, 64 pp., $2.82. Grades 1-3.

Considers fractions, counting, measurement, the operations of addition and subtraction, and why arithmetic is important.

Lemke, Horst. *One Times One.* Watts, 1968, unpaged, $4.95. Grades K-1.

Basically a counting book of sets of things (1-20, 30, 40, 50). There are some counting situations shown in picture form that may be interpreted as addition, subtraction, multiplication, or division.

LeSeig, Theodore. See Seuss, Dr.

Lewellen, John. *The True Book of Airports and Airplanes.* Illustrated by Richard Gates. Childrens, 1956, 46 pp., $3.50. Grades 1-3.

Language of number, position, comparison, and measurement appears in this simple, factual book about airports.

Lewis, Alfred. *New World of Computers.* Dodd, 1965, 79 pp., $3.50. Grades 3-8.

A brief history of various computing devices and a description of the kinds of work done by the electronic computers, chiefly the digital type.

Lexau, Joan M. *Archimedes Takes a Bath.* Illustrated by Salvatore Murdocca. Crowell, 1969, 55 pp., $3.50. Grades 3-5.

An imaginative story of how Archimedes might have solved the problem of the adulteration of the gold in the king's crown.

Linn, Charles F. *Estimation.* Illustrated by Don Madden. A Young Math Book. Crowell, 1970, 33 pp., $3.75. Grades 3-6.

Suggests experiments and activities for home, for play, and for school. All are helpful in the development and improvement, through practice, of skills in making and checking estimates.

Lionni, Leo. *Inch by Inch.* Grosset, 1962, unpaged, $4.50. Grades K-1.

Beginning idea of an inch as a unit of length developed as an inchworm is shown measuring objects of nature. Beautifully illustrated.

Little Owl Books. Holt, 1963, unpaged, $99.96 per set. Individual titles at $2.50 each. Grades K-2.

A set of forty books for an individualized supplementary reading program. The following ten books relate to mathematics: *Captain Murphy's Tugboats,* by William Hall; *Five Is 5,* by Howard F. Fehr; *Going Up, Going Down,* by H. R. Wittram; *One, Two, Three, Four,* by Ruby Schuler and Kate Considine; *Poems for Counting* and *Round Is a Pancake,* by Joan Sullivan; *Ten Pennies for Candy,* by Henry Ritchet Wing; *This Is My Family,* by Howard F. Fehr; *Three Little Dachshunds,* by Margaret Otto; and *What Is Big?* by Henry Ritchet Wing.

MacAgy, Douglas, and Elizabeth MacAgy. *Going for a Walk with a Line.* Doubleday, 1959, unpaged, $3.95. Grades 2-7.

The line and its use in famous modern paintings are presented with brief text and reproductions of the paintings.

McLeod, Emilie Warren. *One Snail and Me.* Illustrated by Walter Lorraine. Little, 1961, 32 pp., $3.95. Grades K-1.

A beautifully illustrated picture book to develop the concepts of one through ten.

_____. *The Seven Remarkable Bears.* Illustrated by Juliet Kepes. Houghton, 1954, 46 pp., $3.25. Grades K-3.

Po, the only polar bear in a city zoo, was bored and unhappy until he had a bright idea that changed his world. Ordinal and cardinal numbers through seven and concepts of position and comparison are used.

Malter, Morton S. *Our Largest Animals.* Illustrated by Dirk Gringhuis. Whitman, 1958, 31 pp., $2.75. Grades 3-6.

Language of relative size, weight, and time and many number names from one to 12,000 effectively used as the largest animals of the world are described.

_____. *Our Tiniest Animals.* Illustrated by Dirk Gringhuis. Whitman, 1955, 32 pp., $2.00. Grades 3-5.

Language of number, weight, time, and relative size used to describe the life of small animals.

Marino, Dorothy. *Edward and the Boxes.* Lippincott, 1957, unpaged, $3.79. Grades 1-3.

A boy collects boxes to make houses the right size for himself and his pets.

Memling, Carl. *I Can Count.* Illustrated by Feodor Rojankovsky. Golden, 1963, unpaged, $2.39. Grades K-1.

A counting book based on pictures of sets of animals, one to ten.

_____. *10 Little Animals.* Illustrated by Feodor Rojankovsky. Golden, 1961, unpaged, $1.29. Grades K-2.

A counting story that uses both names and numerals for the numbers ten to one.

Milgrom, Harry. *Adventures with a Ball.* Illustrated by the Strimbans. Dutton, 1965, 31 pp., $3.46. Grades 1-3.

A book that helps children think about the characteristics of a ball-shaped object, the sphere.

Montgomerie. Norah. *One, Two, Three: A Little Book of Counting Rhymes.* Abelard, 1968, 32 pp., $2.73. Grades K-1.

A collection of counting rhymes with pictures.

Murray, William D., and Francis J. Rigney. *Paper Folding for Beginners.* Dover, 1960, 94 pp., paper, $1.00. Grades 3-8.

Descriptions for making objects by folding, tearing, or cutting paper.

My Counting Book. Platt, 1968, 10 pp., $1.95. Grades K-1.

A durable counting book (1-10) with clear, distinct pictures.

Myller, Rolf. *How Big Is a Foot?* Atheneum, 1962, unpaged, $3.62. Grades 1-3.

An amusing story of the first use of the foot as a unit of measure. Children will find the book more fun after they have used the inch, foot, and yard as units of measure.

Nohelty, Sally, compiler. *Eleven and Three Are Poetry.* See Young Owl Books. Grades 2-4.

Collection of counting rhymes.

Norling, Jo, and Ernest Norling. *Pogo's Sea Trip: A Story of Boats.* Holt, 1949, 50 pp., $2.92. Grades 1-3.

The story of a tugboat trip makes wide use of number and comparison.

O'Brien, Thomas C. *Odds and Evens.* Illustrated by Allan Eitzen. A Young Math Book. Crowell, 1971, 33 pp., $3.75. Grades 3-5.

Idea of odd and even numbers and their additive properties developed through many clever examples. Questions like these are asked—Why is it best to have an even number of players in a game? An odd number of voters in an election?

Otto, Margaret. *Three Little Dachshunds.* See Little Owl Books. Grades K-2.

Story of three lost dachshunds and two children. Uses numbers one through three.

Oxenbury, Helen. *Numbers of Things.* Watts, 1970, unpaged, $4.95. Grades K-1.

Counting book with pictures of sets of things and the numbers of the sets shown in numerals and words (1-10, 20, 30, 40, 50, and many).

Pine, Tillie S., and Joseph Levine. *The Chinese Knew.* Illustrated by Ezra J. Keats. McGraw, 1958, 32 pp., $3.83. Grades K-4.

The ancient Chinese employed the same scientific principles we use today in making ink and paper, in making and using the abacus and water clock, and in other activities. Includes directions for making some of the objects as well as experiments for proving the principles involved.

Podendorf, Illa. *Animals and More Animals.* Illustrated by Elizabeth Rice. Childrens, 1970, 47 pp., $3.95. Grades 3-6.

Excellent book on animals and their sizes. Incorporates metric units of length and the idea of scale drawings.

_____. *How Big Is a Stick?* Illustrated by Richard Mlodock. Childrens, 1971, 48 pp., $3.95. Grades 2-5.

Difference in size of sticks is used to help develop need for measurement of length. Simple methods of measurement lead to need for common unit of measure and introduction of centimeter and meter.

_____. *Many Is How Many?* Illustrated by Jack Haesly. Childrens, 1970, 48 pp., $3.95. Grades 2-4.

The relative nature of comparison of how many (fewer or more), how big (bigger, smaller), and how far (long way or short way) is cleverly developed in text and pictures by asking and answering questions.

Poems for Counting. See Little Owl Books. Grades K-2.

A cleverly illustrated collection of counting poems from a variety of sources.

Posell, Elsa. *True Book of Whales.* Childrens, 1963, 47 pp., $3.50. Grades 1-3.

Interestingly presented information about whales; uses ideas of number, size, distance, time, and weight.

Rees, Elinor. *At the Bank.* Illustrated by Gene Holtan. Childrens, 1959, unpaged, $2.75. Grades 2-5.

Illustrated description of many banking activities such as the opening of a savings account by a boy who wants to buy a bicycle.

Reiss, John C. *Numbers.* Bradbury, 1971, 32 pp., $4.95. Grades K-1.

Distinct pictures of sets of things with the corresponding number of each set shown in numerals and words. (1-20, 30, 40, 50, 60, 70, 80, 90, 100, 1000.)

Rossetti, Christina. *Adding: A Poem.* See Young Owl Books. Grades 2-4.

Pictures and two-line rhymes about addition situations.

Rothschild, Alice. *Bad Trouble in Miss Alcorn's Class.* Illustrated by Irwin Rosenhouse. Scott, 1959, 101 pp., $3.00. Grades 1-3.

A wise teacher and children solve the problem of stealing in a second grade. The vocabulary of number, position, relationship, and time is used.

Russell, Solveig Paulson. *Lines and Shapes.* Illustrated by Arnold Spilka. Walck, 1965, 31 pp., $4.25. Grades 3-5.

A clever introduction, with easy-to-read text and drawings, to some very elementary geometric ideas that are shown by objects in the world around us. Some ideas used are lines, angles, polygons, and spheres.

———. *Lines and Shapes: A First Look at Geometry.* Illustrated by Arnold Spilka. Walck, 1965, 32 pp., $4.25. Grades 1-3.

Introduction to geometry by examining environment for lines and shapes. Ideas introduced are perpendicular, horizontal, vertical, and parallel lines; right, acute, and obtuse angles; triangle, rectangle, square, and other polygons; circle, oval, crescent, arc, semicircle, sphere, cone, pyramid, and cube.

———. *One, Two, Three and Many: A First Look at Numbers.* Illustrated by Margot Tomes. Walck, 1970, 47 pp., $4.25. Grades 3-6.

An interesting book about numbers and their history, symbolism for number, approximate numbers, and counting machines.

Schlein, Miriam. *City Boy, Country Boy.* Illustrated by Katherine Evans. Childrens, 1955, unpaged, $3.50. Grades 2-3.

A boy who lives in the country and one who lives in the city each describes his life during one year, using concepts of time, size, position, and number.

———. *Fast Is Not a Ladybug.* Illustrated by Leonard Kessler. A-W, 1953, unpaged, $3.60. Grades K-3.

Narrative about moving objects helps to make clear the concepts of fast and slow.

———. *Heavy Is a Hippopotamus.* Illustrated by Leonard Kessler. A-W, 1954, unpaged, $3.60. Grades K-3.

Excellent text and illustrations help clarify the relative nature of light and heavy. What is heavy for an ant is light for a child; what is heavy to a child is light to a hippopotamus.

———. *It's about Time.* Illustrated by Leonard Kessler. A-W, 1955, unpaged, $3.60. Grades 1-3.

Verse and pictures develop units of time, such as second, minute, hour, and day.

———. *Shapes.* Illustrated by Sam Berman. A-W, 1952, unpaged, $3.60. Grades K-2.

Familiar objects help develop geometric concepts of round, square, line, straight line, curve, long, and tall.

Schuler, Ruby, and Kate Considine. *One, Two, Three, Four.* See Little Owl Books. Grades K-2.

Introduces numbers from one through twelve with sets of animals and first through twelfth with months of the year.

Schwartz, Julius. *The Earth Is Your Spaceship.* Illustrated by Marc Simont. McGraw, 1963, 32 pp., $3.83. Grades 2-3.

Explains how the reader, like a rider on a spaceship, has orbited the sun once for each year in his age.

Selfridge, Oliver G. *Fingers Come in Fives.* Illustrated by Murray Tinkelman. Houghton, 1966, 44 pp., $3.07. Grades 2-5.

A delightful book that tells of the use of specific numbers, for example, each number 1 to 16, 40, 52, 666, and 31,536,000.

Seuss, Dr. [pseudonym of T. S. Geisel] *McElligot's Pool.* Random, 1947, 64 pp., $4.19. Grades K-3.

The story of a little boy who imagines what he can catch as he fishes in a small pool; uses ideas of number, comparison, shape, size, length, and height.

———. *Ten Apples Up on Top.* Random, 1961, 63 pp., $2.39. Grades K-1.

A picture-counting book with rhymes.

———. *Yertle the Turtle.* Random, 1958, unpaged, $4.19. Grades K-3.

Yertle uses concepts of number, comparison, and measurement as he yearns for a higher throne and a larger kingdom and attempts to get them.

Shapp, Charles, and Martha Shapp. *Let's Find Out What's Big and What's Small.* Illustrated by Vana Earle. Watts, 1959, unpaged, $3.75. Grades 1-3.

Text and pictures show vividly the relative meaning of size. These questions are discussed: What is big? What is small? What is short? What is tall?

Shapp, Martha, and Charles Shapp. *Let's Find Out What's Light and What's Heavy.* Illustrated by Ida Scheib. Watts, 1961, unpaged, $3.75. Grades 1-3.

Text and pictures compare the weights of common objects.

Sharp, Elizabeth N. *Simple Machines and How They Work.* Illustrated by Ida Scheib. Random, 1959, 83 pp., $3.47. Grades 1-3.

This account of wheels, pulleys, levers, screws, wedges, and inclined planes, with experiments to prove their usefulness, makes extensive use of the language of size, position, and comparison.

Shay, Arthur. *What Happens When You Put Money in the Bank.* Regnery, 1967, 32 pp., $4.50. Grades 1-6.

Two children visit a large bank to see what the money they deposit may do to allow the bank to pay them interest.

Simon, Leonard. *Counting Lightly.* See Young Owl Books. Grades 2-4.

A story that shows the need for number, names for numbers, and counting.

———. *The Day Numbers Disappeared.* Illustrated by Jeanne Bendick. McGraw, 1963, 48 pp., $3.51. Grades 3-6.

An amusing story of a teacher and his class who tried to get along without numbers and arithmetic. Leads to an examination of ancient numeration systems and some computation on an abacus.

———. *Stretching Numbers.* See Young Owl Books. Grades 2-4.

Story based on the approximate nature of measurement of length.

Slobodkin, Louis. *Millions and Millions.* Vanguard, 1955, unpaged, $3.95. Grades K-1.

Pictures and text combine to develop effectively the idea of millions as many.

———. *One Is Good but Two Are Better.* Vanguard, 1956, unpaged, $4.50. Grade K.

Ideas of one and two are developed through examples of activities in which two can play better than one.

Spink, Michael. *The 1-2-3 Frieze.* Dutton, 1968, unpaged, $2.75. Grades 1-2.

Consists of two friezes, one with one large picture and questions about number (1-10) of things in the picture and a second frieze that uses reassembled things in individual pictures and numerals to answer the questions.

Srivastava, Jane Jonas. *Weighing and Balancing.* Illustrated by Aliki. A Young Math Book. Crowell, 1970, 33 pp., $3.75. Grades 3-6.

Through building and using a balance the reader is guided in developing a concept of weight by investigating such questions as these: Which is heavier, an apple or 10 marbles? Which is heavier, a pound of nuts or a brick? Which is heavier, a pound of apples or a pound of stones?

Scarry, Muriel. *One, Two, Three for Fun*. Illustrated by Seymour Fleishman. Whitman, 1967. 32 pgs., $2.95. Grades K-1.

Introduces through pictures of everyday activities the numbers 1 to 3, corresponding number words and numerals, the ordinals first and last, and the concept of many.

Scarbrough, Ralph. *The Little Red Computer*. McGraw, 1969. 32 pgs., $4.33. Grades K-2.

Fantasy about a computer that did not know 2 + 2 = 4, but was programmed for more complicated tasks which resulted in its going on an important expedition.

Stangel, Hansgeorg. *Busy Builders—a Counting Picture Book*. Illustrated by Ingeborg Meyer-Rey and Rudolf Schultz-Dobrowski. Childrens, 1969. unpaged, $3.50. Grades K-1.

A counting story with each number from one to ten shown by a set of blocks, a picture of a set of farmers, a set of tables, a numeral, and a number name.

Sterne, James. *Bird Business*. Illustrated by the author. McKay, 1961. unpaged, $3.14. Grades K-1.

Uses some language of geometry as it gives some amusing reasons. For example, "A ball is round because if it were square, it couldn't roll."

Sullivan, Joan. *Poems for Counting*. See Little Owl Books. Grades K-2.

_____. *Round Is a Pancake*. See Little Owl Books. Grades K-2.

Many round objects are pictured and named in rhyme.

Swortzman, Christel. *Count with Me*. Illustrated by Edith Wist. Platt, 1968. unpaged, $1.95. Grades K-2.

An illustrated first-person story about counting. In the printed text numerals are used to name the numbers from one to twelve.

Thayer, Jane. *Andy's Square Blue Animal*. Illustrated by Meg Wohlberg. Morrow, 1962. 48 pgs., $2.95. Grades K-1.

A fanciful tale about Andy's imaginary animal. Introducing words describing shape such as round, three-cornered, oblong, square, and the number words one, two, and three.

Tresselt, Alvin. *Follow the Road*. Illustrated by Roger Duvoisin. Lothrop, 1953. unpaged, $2.84. Grades 1-2.

Ideas of square, circle, rectangle, and oval are used to tell about a small boy who decides to take his wagon and follow the road.

True, Louise, and Lillian Owens. *Number Men*. Children's, 1948, 32 pgs., $3.50. Grades 1-2.

Directions for writing the number symbols from one to ten, given in verse. The pictures of groups of objects are simple and easy to use.

Tudor, Tasha. *Around the Year*. Walck, 1957, 56 pgs., $4.25. Grades K-3.

Effective pictures and verse tell about each month of the year.

_____. *1 Is One*. Walck, 1956, unpaged, $4.25. Grades K-1.

This counting book effectively illustrates each number group from one through twenty.

Ungerer, Tomi. *Snail, Where Are You?* Harper, 1962, unpaged, $3.27. Grades 1-3.

Spiral designs incorporated into colorful drawings are to be discovered in answering the question in the title of the book.

Vogel, Ilse Margret. *1 Is No Fun, but 20 Is Plenty*. Atheneum, 1965, unpaged, $3.07. Grades K-1.

An attractive picture book with conversation in rhyme about sets of 1 to 20 objects.

Weber, Marion. *Annette*. Illustrated by Nanda Huber-Schaim. Evans, 1971, 32 pgs., $3.95. Grades K-3.

This charming book encourages children to create, by use of a mirror (a metal one is included with the book), a change in a series of pictures and thereby to develop important mathematical concepts.

_____. *Make a Bigger Puddle, Make a Smaller Worm*. Evans, 1971, 32 pgs., $3.95. Grades K-3.

This charming book encourages children to use a mirror (a metal one is included with the book) to change a series of pictures. Imaginations are challenged as children observe what happens when they place the mirror on various parts of each page, and when they move the mirror. Many mathematical concepts are used—longer, whole, straight, and symmetry.

Watson, Nancy Dingman. *Annie's Spending Spree*. Illustrated by Aldren A. Watson. Viking, 1957, 45 pgs., $3.25. Grades K-3.

Annie learns about her birthday dollar in terms of half-dollars, quarters, dimes, nickels, and cents. Her adventure at a store helps her appreciate its value as she finds what she can buy.

_____. *What Is One?* Illustrated by Aldren A. Watson. Knopf, 1954, unpaged, $3.99. Grades K-1.

A boy uses easy and commonplace examples to teach his younger sister the meaning of the numbers from one to ten.

_____. *When Is Tomorrow?* Illustrated by Aldren A. Watson. Knopf, 1955, unpaged, $4.39. Grades K-1.

Linda's confusion with tomorrow and today provides an opportunity for children to develop a better understanding of the concept of time.

Webber, Irma E. *It Looks like This.* Hale, 1958, unpaged, $1.75. Grades 1-3.

Four mice look at animals from different views: front, back, side, and above. Each animal presents different pictures, depending on the position of the viewer. The mice conclude that one object can have as many different appearances as there are ways to look at it.

White, Florence. *I Boy Lives in My House.* Illustrated by Aliki Goldey, 1965, unpaged, $1.29. Grades K-2.

A counting story that uses numbers and numerals one through ten.

Wildsmith, Brian. *Brian Wildsmith's 1, 2, 3's.* Watts, 1965, unpaged, $4.95. Grades K-1.

A beautifully colored picture-counting book relating numerals, words, and sets to the numbers 1-10.

Wing, Henry Ritchet. *Ten Pennies for Candy.* See Little Owl Books. Grades K-2.

Problem: Will ten pennies buy candy for a boy and his friends?

_____. *What Is Big?* See Little Owl Books. Grades K-2.

Comparison of the size of a child with that of larger and smaller animals.

Winters, H. R. *Going Up, Going Down.* See Little Owl Books. Grades K-2.

The elevator shaft in a children's toy shop becomes a number line, the basis for questions about sequence of numbers.

Wolff, Janet, and Bernard Owett. *Let's Imagine Numbers!* Dutton, 1964, unpaged, $4.50. Grades 1-2.

A picture book with simple text for the development of the number ideas for one through twelve and a few larger numbers.

Woodley, Catherine. *Two Hundred Pennies.* Morrow, 1947, 128 pp., $3.25. Grades 1-3.

The value of a dollar in pennies is developed, and addition and subtraction ideas are introduced through this story of a boy who wants to buy a train.

Wright, H. R. *Four Threes Are 12.* See Young Owl Books. Grades 2-4.

Description and pictures of objects that show multiplication situations.

———. *A Maker of Boxes.* See Young Owl Books. Grades 2-4.

Clever story that shows many solids and how to draw and make models of the solids.

Young Owl Books. Holt, 1964, $113.28 per set. Individual titles at $2.97 each. Grades 2-4.

A set of forty books for an individualized supplementary reading program. The following ten books relate to mathematics: *Adding: A Poem,* by Christina Rossetti; *Counting Lightly,* by Leonard Simon; *Delight in Number,* by Leland B. Jacobs, compiler; *Eleven and Three Are Poetry,* by Sally Nohelty, compiler; *Four Threes Are 12,* by H. R. Wright; *Fun with the Calendar,* by Henry W. Ford; *If You Can Count to Ten,* by Howard F. Fehr; *A Maker of Boxes,* by H. R. Wright; *Stretching Numbers,* by Leonard Simon; *Twenty White Horses,* by Eldon Grant.

Zaner, Feenie, and Paul Galdone. *Counting Carnival.* Coward, 1962, unpaged, $2.86. Grades K-1.

A colorful counting book with short verses about numbers from one to twelve, with numerals.

Zaner, Feenie, and Elizabeth Thompson. *The True Book of Time.* Childrens, 1956, unpaged, $3.50. Grades 1-3.

Different ways people have recorded the passing of time are explained, and an easy lesson is given on the modern clock.

Zolotow, Charlotte. *One Step, Two . . . .* Illustrated by Roger Duvoisin. Lothrop, 1955, unpaged, $3.78. Grade K.

Ellen and her mother take a walk and use the vocabulary of number, comparison, position, size, shape, and time as they describe what they see. The illustrations are effective.

———. *Over and Over.* Illustrated by Garth Williams. Harper, 1957, unpaged, $3.79. Grade K.

Holiday after holiday comes for a little girl, and she wishes for them all to come again. This book is excellent for developing the idea of time.

Intermediate Grades

Abbott, Janet S. *Learn to Fold—Fold to Learn.* See *Primary.*

_____. *Mirror Magic.* See *Primary.*

Adler, Irving. *The Giant Golden Book of Mathematics.* Illustrated by Lowell Hess. Golden, 1960, 96 pp., $4.99. Grades 5-8.

A collection of short expositions on a variety of mathematical topics. Included are number symbolism, measures, primes, applications, and some short biographical sketches. It is well illustrated and has a good index.

_____. *Magic House of Numbers.* Illustrated by Ruth Adler. Day, 1957, 128 pp., $3.69. New American, paper. Grades 6-8.

The basic hows and whys of our number system made interesting through mathematical curiosities, riddles, tricks, and games.

_____. *Time in Your Life.* Illustrated by Ruth Adler. Day, 1955, 127 pp., $3.69. Grades 5-8.

Man's reliance upon the sun, moon, and stars as indicators of time; early and modern timepieces; the history of the calendar; time zones; and other important influences of time in our lives are considered.

Adler, Irving, and Ruth Adler. *The Calendar.* See *Primary.*

_____. *Directions and Angles.* Illustrated by Ellen Viereck. Day, 1969, 48 pp., $2.86. Grades 4-6.

Development of names and definitions for many geometric concepts such as ray, half-plane, interior of angles, and size of angles, starting from the idea of an arrow to indicate a direction.

———. *Numbers Old and New.* Illustrated by Peggy Adler. Day, 1960, 48 pp., $3.27. Grades 4-6.

Considers old and new ways of counting, ways of writing symbols for numbers, broken numbers, square numbers, magic squares, and number tricks.

———. *Numerals: New Dresses for Old Numbers.* Illustrated by Ruth Adler. Day, 1964, 48 pp., $3.27. Grades 4-6.

A book about numerals of a base-ten numeration system and of other bases and the use of the numerals to show operations on numbers. Exercises with answers are included.

———. *Sets.* See *Primary.*

Andrews, F. Emerson. *Numbers, Please.* Illustrated by Aldren A. Watson. Little, 1961, 101 pp., $3.75. Grades 4-8.

A book about the language we use to speak about numbers, operations on them, and relations among them—numeration systems. Includes some tricks and shortcuts that result from particular symbolisms.

Asimov, Isaac. *Quick and Easy Math.* Houghton, 1964, 180 pp., $3.00. Grades 5-8.

Designed to develop shortcuts for making numerical computations more efficiently.

Barnard, D. St. P. *A Book of Mathematical and Reasoning Problems: Fifty Brain-Twisters.* Van Nostrand, 1963, 109 pp., $2.50. Grades 6-8.

A collection of fifty "reasoning" problems. Special sections provide "leads" or hints for solutions. The solutions generally stress the mathematical nature of the reasoning involved.

———. *One Hundred Braintwisters.* Van Nostrand, 1967, 168 pp., $3.95. Grades 6-8.

A continuation of the collection in the author's *Fifty Brain-Twisters.* Also includes leads and solutions.

Barr, Donald. *Arithmetic for Billy Goats.* See *Primary.*

Behn, Harry. *All Kinds of Time.* See *Primary.*

Bell, Thelma. *Snow.* Illustrated by Corydon Bell. Viking, 1954, 56 pp., $3.37. Grades 4-7.

A carefully written account about snowflakes, their formation, and related icy forms; employs ideas of geometry, measurement, and fractions.

Bendick, Jeanne. *All around You.* See *Primary.*

_____. *Archimedes and the Door of Science.* Watts, 1962, 143 pp., $4.50. Grades 5-8.

An interestingly written story of Archimedes, a mathematician, inventor, and pioneer of the scientific method. Some elementary ideas of science and mathematics used by Archimedes are discussed in an interesting way. Simply and effectively illustrated.

_____. *The First Book of Time.* Illustrated by the author. Watts, 1963, 70 pp., $3.75. Grades 4-6.

An account of the natural and artificial units man has for measuring time and the instruments he uses.

_____. *How Much and How Many.* McGraw, 1947, 188 pp., $3.22. Grades 5-8.

This story gives both the historical background and modern applications of weights and measures. It is an excellent source book.

_____. *Names, Sets and Numbers.* Illustrated by the author. Watts, 1971, 65 pp., $3.95. Grades 4-6.

Pictures and text illustrate many sets. Questions and answers help readers understand number of a set, idea of very large numbers, and an approximate number.

_____. *Shapes.* See *Primary.*

_____. *Space and Time.* See *Primary.*

Bendick, Jeanne, and Marcia O. Levine. *Mathematics Illustrated Dictionary.* McGraw, 1965, 223 pp., $4.50. Grades 4-8.

Definitions, descriptions, explanations, and illustrations of mathematical terms. Also contains some interesting problems, brief biographies, tables of symbols, formulas, weights and measures, square roots, and logarithms. Valuable reference for any school library.

_____. *Take a Number.* McGraw, 1961, 63 pp., $3.83. Grades 4-6.

Easy-to-read discussion of the history of numeration, the binary system and computers, the number of numbers, perfect numbers, prime numbers, and fun with numbers.

_____. *Take Shapes, Lines and Letters.* McGraw, 1962, 79 pp., $2.95. Grades 4-8.

Interesting, simple text and drawings suggest many geometric, topological, and related mathematical ideas. Emphasizes that although models are useful, mathematics is "an adventure of the mind."

Berge, Olive S. *I've Got Your Number, John.* See Wise Owl Books. Grades 4-6.

A personal letter to a child reminds him of the importance of numbers.

Blough, Glenn O. *Wait for the Sunshine.* See *Primary.*

Boeke, Kees. *Cosmic View: The Universe in 40 Jumps.* Day, 1957, 48 pp., $4.50. Grades 4-6.

A series of pictures and drawings with descriptive text to show the idea of scale and relative sizes of objects from galaxies to nuclei of sodium atoms. A familiar object is first pictured one-tenth life size and is successively represented with other objects in drawings until the scale is $1:10^{26}$. Similarly, a small portion is successively enlarged until the scale is $10^{13}:1$.

Bowers, Henry, and Joan E. Bowers. *Arithmetical Excursions: An Enrichment of Elementary Mathematics.* Dover, 1961, 320 pp., paper, $2.00. Grades 5-8.

A large collection of mathematical miscellanea. Each section includes a set of exercises with answers.

Bragdon, Lillian J. *Tell Me the Time, Please.* Lippincott, 1946, 103 pp., $3.59. Grades 4-8.

How time has been kept by stars, shadows, water clocks, hourglasses, and modern clocks is described; and time zones in the United States are discussed.

Branley, Franklyn M. *North, South, East, and West.* See *Primary.*

Brinckze, Ruth. *The Story of Our Calendar.* Vanguard, 1949, 64 pp., $3.95. Grades 4-8.

Information about the different types of calendars developed through the ages; the use made of the sun, moon, and stars in keeping time records; the international date line; latitude and longitude; and Greenwich time.

Brooke, Maxey. *150 Puzzles in Crypt-Arithmetic.* Dover, 1963, 71 pp., paper, $1.25. Grades 5-8.

A wealth of easy-to-difficult puzzles that are formulated by substituting letters for digits. A general method of solution is suggested. Answers to all puzzles are included.

Broudy, Rose L. *Modern Math Made Easy.* Illustrated by Vincent Colabella. Harvey, 1970, 126 pp., $4.50. Grades 5-8.

Reference book on some basic mathematical ideas such as principles of operations, primes and composites, and proof. Glossary and index are included.

Buehr, Walter. *Keeping Time.* Putnam, 1960, 94 pp., $3.79. Grades 4-6.

Story of need for and attempts to keep track of time. There are chapters on the calendar, time-keeping instruments, and clockmakers.

———. *Treasure: The Story of Money and Its Safeguarding.* Putnam, 1955, 64 pp., $3.79. Grades 4-6.

The story of advancement from early barter to modern financial systems. The safeguarding of treasure through the ages is a secondary theme.

Buff, Mary, and Conrad Buff. *Big Tree.* Viking, 1946, 80 pp., $3.50. Grades 5-8.

The life of a giant redwood tree with its friends and enemies through the centuries illustrates the concepts of time and size.

Carlson, Bernice W. *Make It and Use It.* Illustrated by Aline Hansens. Abingdon, 1958, 160 pp., $2.95. Grades 4-6.

More than 100 inexpensive, easy-to-do projects, with clear directions and helpful pictures, require the use of measurement ideas.

Carona, Philip B. *Things That Measure.* Illustrated by John Kaufmann. Prentice, 1962, 72 pp., $3.95. Grades 4-7.

Discussion of the need for measurement and the measurement devices that man has developed. Some historical discussion, e.g., the cubit, illustrates the need for, and accomplishment of, standardization.

Charosh, Mannis. *The Ellipse.* Illustrated by Leonard Kessler. A Young Math Book. Crowell, 1971, 33 pp., $3.75. Grades 5-7.

Directions, with excellent illustrations, for sketching and then constructing ellipses, and a consideration of their properties. The circle is considered as a special ellipse.

———. *Straight Lines, Parallel Lines, Perpendicular Lines.* Illustrated by Enrico Arno. A Young Math Book. Crowell, 1970, 33 pp., $3.75. Grades 4-6.

Familiar objects used to illustrate straight, parallel, and perpendicular lines. The language used to describe the geometric ideas is well chosen.

Davidson, Jessica, and William C. Martin. *Mind in a Maze.* Illustrated by Eric Gurney. Prentice, 1969, 72 pp., $3.95. Grades 6-9.

A collection of puzzles, some of which are standard, classified as arithmetic, horse sense, logical, word, fitting pieces together, and an "unclassified" group. Some with hints or answers. Some within each classification are arranged in order of difficulty.

Davis, Barbara. *Learning Science through Cooking.* Drawings by Diana Medworth. Sterling, 1964, 80 pp., $3.95. Grades 5-8.

Ideas of measurement used in simple recipes and experiments in the kitchen.

Degrazia, Joseph. *Math Is Fun.* Emerson, 1954, 159 pp., $4.95. Grades 5-8.

A collection of easy-to-difficult mathematical puzzles, with answers.

Denholm, Richard A. *Making and Using Graphs and Nomographs.* Franklin Mathematics Series. Franklin, 1968, 104 pp., $1.80, paper. Grades 5-6.

A workbook-type, supplementary material that contains appropriate development of graphing sets of whole numbers and integers on the number line, of graphing sets of pairs of numbers on a coordinate system, and of using several kinds of nomographs to find sums, products, addends, and factors.

———. *Mathematics: Man's Key to Progress, Book A.* Franklin Mathematics Series. Franklin, 1968, 104 pp., $3.15. Grades 6-8.

Self-directed, supplementary learning activities about the history of mathematics, presented in picture and prose and followed by do-it-yourself, related activities. For example, an interesting discussion of "How the Ancient Egyptians Made Use of Mathematics" is followed by suggestions for making and using "rope stretchers" to construct right angles and "plummets" to construct vertical edges.

Dennis, J. Richard. *Fractions and Parts of Things.* See *Primary.*

Diggins, Julia E. *String, Straightedge, and Shadow: The Story of Geometry.* Viking, 1965, 160 pp., $4.53. Grades 5-8.

The story of how man's practical need to measure and his curiosity about order in the universe led to the development of geometry.

Dilson, Jesse. *The Abacus: A Pocket Computer.* Illustrated by Angela Pozzi. St. Martin's, 1968, 143 pp., $3.95. Grades 6-8.

A guide to learning to compute on the Chinese abacus. Also included are descriptions of ancient written number notations of Babylonia, Egypt, and Rome and how the abacus could be used with base-two numerals.

Downer, Marion. *Discovering Design.* See *Primary.*

Dripdale, Thomas, and John Dunworth. *Millions of People.* See Wise Owl Books. Grades 4-6.

Interpretation of graphs that give information about population.

Elkin, Benjamin. *The True Book of Money.* See *Primary.*

Emmet, E. R. *Brain Puzzler's Delight.* Emerson, 1970, 254 pp., $5.95. Grades 6-9.

One hundred puzzles of varying types that are arranged in order of difficulty. Solutions are included.

Epstein, Beryl, and Sam Epstein. *The First Book of Measurement.* Illustrated by Walter Buehr. Watts, 1960, 60 pp., $2.65. Grades 5-8.

Approaches measurement as providing a means to answer such questions as "How big?" and "How fast?" History of the standardizing of units for weight, length, temperature, and time, and the development of suitable instruments of measure.

Epstein, Sam, and Beryl Epstein. *The First Book of Codes and Ciphers.* Illustrated by Lazlo Roth. Watts, 1956, 62 pp., $2.65. Grades 4-6.

Explains the technical difference between codes and ciphers and gives many simple examples with exercises.

Estep, Irene. *Good Times with Maps.* Illustrated by Robert Smith. Childrens, 1962, 31 pp., $2.50. Grades 4-5.

Easy-to-read text and pictures on the construction of maps and their use. One section, "The Scale of Miles," is helpful for developing concepts of measurement.

Fehr, Howard F. *If You Can Count to Ten.* See Young Owl Books, *Primary.*

_____. *Number Patterns Make Sense.* See Wise Owl Books. Grades 4-6.

Interesting ways of performing operations, and other patterns.

Fenton, Carroll L., and Mildred A. Fenton. *Worlds in the Sky.* Day, 1950, 96 pp., $3.69. Grades 5-7.

Ideas of distance and size are utilized in this informative book about the sun, planets, moon, and stars.

Feravolo, Rocco. *Wonders of Mathematics.* Dodd, 1963, 64 pp., $3.95. Grades 5-8.

How mathematics was developed and has been and is being used by man. Simple activities and problems to demonstrate what mathematics can do.

Fey, James T. *Long, Short, High, Low, Thin, Wide.* Illustrated by Janie Russell. A Young Math Book. Crowell, 1971, 33 pp., $3.75. Grades 4-6.

Many activities in the measurement of length, some imitating legendary events, suggest that measuring is comparing and that standard units of measurement are needed.

Fletcher, Helen Jill. *Put On Your Thinking Cap.* Illustrated by Quentin Blake. Abelard, 1968, 125 pp., $3.50. Grades 4-7.

A collection of more than 100 puzzles of many types, with answers.

Fogel, Barbara R., *What's the Biggest?* See *Primary.*

Ford, Henry W. *Dr. Frick and His Fractions.* See Wise Owl Books. Grades 4-6.

Fractions used to describe a magician's tricks. Some interesting and challenging problems are included.

———. *Fun with the Calendar.* See Young Owl Books, *Primary.*

Fowler, H. Waller, Jr. *Kites.* Ronald, 1953, 95 pp., $5.00. Grades 5-8.

A detailed description of different types of kites, their history, and their construction. This book can contribute to the development of measurement, comparison, and geometric ideas.

Frédérique and Papy [Frédérique Papy and Georges Papy]. *Graph Games.* See *Primary.*

Freeman, Mae Blacker. *The Story of Albert Einstein.* Random, 1958, 192 pp., $4.79. Grades 5-9.

Easy-to-read biography of a mathematician and scientist who spent a lifetime searching for the secrets of the universe.

Freeman, Mae Blacker, and Ira Freeman. *Fun with Astronomy.* Random, 1953, 64 pp., $3.39. Grades 4-8.

Source book applies ideas of measurement of time and distance. Many simple experiments are suggested.

———. *Fun with Figures.* Random, 1946, 64 pp., $3.39. Grades 5-8.

Fun with geometry results from following the suggested experiments with straight-line figures, curves, and solids.

Friskey, Margaret, ed. *About Measurement.* See *Primary.*

Frohlichstein, Jack. *Mathematical Fun, Games and Puzzles.* Smith, 1962, 306 pp., $4.00. Grades 5-8.

A book (with answers) of 334 puzzles, 20 games, 37 fun novelties, and 27 projects that are graded as easy, average, or difficult. Ideas from arithmetic, algebra, and geometry are used.

Froman, Robert. *Bigger and Smaller.* See *Primary.*

———. *Faster and Faster, a Book about Speed.* See *Primary.*

———. *Rubber Bands, Baseballs and Doughnuts: A Book about Topology.* Illustrated by Harvey Weiss. A Young Math Book. Crowell, 1972, 33 pp., $3.75. Grades 4-6.

Clever examples introduce some properties of geometric figures that survive distortion.

Galt, Tom. *Seven Days from Sunday.* Illustrated by Don Freeman. Crowell, 1956, 215 pp., $3.95. Grades 4-8.

The origin of the seven-day week is described; special attention is given to the way folklore and myths about the gods influenced the naming of the days.

Gardner, Martin. *Perplexing Puzzles and Tantalizing Teasers.* Illustrated by Laszlo Kubinyi. Simon, 1969, 95 pp., $3.95. Grades 5-9.

Ridiculous riddles, unusual puzzles, and tricky questions that challenge and entertain. All are interestingly presented in text and drawing. Solutions included.

Grant, Eldon. *Twenty White Horses.* See Young Owl Books, *Primary.*

Haas, Victor E. *The Magic Numerals of Ali Khayyan.* Macrae, 1965, 155 pp., $4.25. Grades 5-8.

A fantasy in which Ali takes a trip to many countries that use numeration systems based on numbers other than ten. In each he learns to interpret the numerals and the difference between number and numeral.

Highland, Esther Harris, and Harold Joseph Highland. *The How and Why Wonder Book of Mathematics.* See *Primary.*

Hogben, Lancelot. *The Wonderful World of Mathematics.* Doubleday, 1968, 69 pp., $3.95. Grades 5-8.

The growth and development of mathematics through the ages described in story and pictures.

Holton, Jean Laity. *Algebra: A New Way of Looking at Numbers.* Illustrated. McKay, 1968, 128 pp., $4.50. Grades 5-8.

A nondepth, step-by-step development of the axioms of algebra.

Horne, Sylvia. *Learning about Measurement.* See *Primary.*

———. *Patterns and Puzzles in Mathematics.* Franklin Mathematics Series. Franklin, 1968, 96 pp., $3.15. Grades 5-8.

Self-directed supplementary learning activities presented in clever patterns or as puzzles. Each activity requires action on the part of the reader; for example, the preparation of somo-cube pieces from twenty-seven individual cubes and experimentation in the construction of various space figures from these somo-cube pieces.

Hunt, Leslie L. *25 Kites That Fly.* Dover, 1971, 110 pp., $1.25, paper. Grades 6-9.

Simple descriptions of and directions for building and flying moderate-sized, plane-surface kites, tailless kites, and compound kites. Making and using a simple clinograph for determining the height of a kite in flight is also discussed.

Hunter, J. A. H. *Fun with Figures.* Dover, 1956, 109 pp., paper, $1.00. Grades 5-8.

A collection of 150 mathematical puzzles presented in the form of anecdotes. Solutions require the use of arithmetic, algebra, geometry, and logic. Answers and a few sample solutions are included.

———. *More Fun with Figures.* Dover, 1966, 109 pp., paper, $1.00. Grades 5-8.

A collection of 150 mathematical problems (teasers) similar to those in *Fun with Figures.*

Hunter, J. A. H., and Joseph S. Madachy. *Mathematical Diversions.* Van Nostrand, 1963, 178 pp., $4.95. Grades 6-8.

A collection of almost a hundred problems classified under such headings as paradoxes, mystic arrays, topological delights, and teasers. Solutions included.

Jacobs, Leland B., compiler. *Delight in Number.* See Young Owl Books, *Primary.*

Johnson, Donovan A., and William H. Glenn. Exploring Mathematics on Your Own series. McGraw, 1961, 303 pp., 18 books, paper, $15.12. Grades 6-8.

A wide variety of mathematical enrichment exercises with answers. The exercises range from those about sets, to number, to the Pythagorean theorem, and to topology.

Jonas, Arthur. *Archimedes and His Wonderful Discoveries.* See *Primary.*

———. *More New Ways in Math.* See *Primary.*

———. *New Ways to Mark.* Illustrated by Aliki. Prentice, 1962. 70 pp., $4.50. Grades 4-6.

Overview of the development of mathematics in relation to man's needs, including his need to count, to record numbers, and to compute; the convenience he finds in algebraic symbolism and knowing about probabilities; and the kinds of problems he solves with the help of mathematics without numbers.

Jones, Madeline. *The Mysterious Hexagons.* Crown, 1965. 44 pp., paper, $1.95. Grades 4-8.

An introduction to hexagons through paper folding. Includes patterns and instructions for making five different hexagons.

Juster, Norman. *The Dot and the Line.* Random, 1963, unpaged, $2.50. Grades 5-8.

A very brief mathematical fable of a straight line and a point. Story and illustrations contribute to the development of geometric ideas.

———. *The Phantom Tollbooth.* Illustrated by Jules Feiffer. Random, 1961, 256 pp., $4.76; paper, $0.95. Grades 5-8.

A fantasy in which the importance of definitions is stressed. Some mathematical ideas are involved in the semantics with which the story unfolds.

Kenyon, Raymond. *I Can Learn about Calculators and Computers.* Harper, 1961, 112 pp., $3.27. Grades 6-9.

A brief history of computing aids from fingers to digital and analog computers. Directions for constructing abaci, Napier's bones, slide rules, simple odometers, and digital and analog computers are included.

Kettelkamp, Larry. *Kites.* See *Primary.*

———. *Puzzle Patterns.* See *Primary.*

Klein, Leonore. *Just a Minute.* See *Primary.*

———. *What Is an Inch?* See *Primary.*

Kohn, Bernice. *Computers at Your Service.* Illustrated by Aliki. Prentice, 1962, 72 pp., $4.50. Grades 4-8.

One section of this simply written book explains the binary system and its use by a computer.

Latham, Jean Lee. *Carry On, Mr. Bowditch.* Illustrated by John O'Hara Cosgrave II. Houghton, 1955, 251 pp., $3.75. Grades 6-8.

Nathaniel Bowditch, apprentice to a ship's chandler in Salem in 1790, had only his own curiosity to encourage him to learn his "figures"; but before he was twenty-one he knew more than most ships' captains, and his tables for navigators have been guiding ships ever since. The story illustrates the importance and excitement of learning mathematics.

———. *Trail Blazer of the Seas.* Illustrated by Victor Mays. Houghton, 1956, 245 pp., $3.95. Grades 6-8.

The achievements of Matthew Fontaine Maury, the father of oceanography, are the result of his constant search for knowledge about the motion of the seas. His problem-solving methods are worth study.

Lauber, Patricia. *The Story of Numbers.* See *Primary.*

Leeming, Joseph. *Fun with Puzzles.* Illustrated by Jessie Robinson. Lippincott, 1946, 128 pp., $5.95. Grades 4-8.

Collection of number puzzles and other types of mathematical puzzles involving coins, counters, and matches.

Letch, Harold H. *Numbers in the Land of Hand.* Southern, 1966, 56 pp., $4.25. Grades 4-6.

An interesting historical development of numbers that uses unique number names and symbols (base five).

Lewis, Alfred. *New World of Computers.* See *Primary.*

Lexau, Joan M. *Archimedes Takes a Bath.* See *Primary.*

Lieber, Lillian R. *Mits, Wits and Logic.* Illustrated by Hugh Lieber. Morton, 1960, 240 pp., $4.95. Grades 6-9.

A clever introduction to postulational thinking and Boolean algebra.

Linn, Charles F. *Estimation.* See *Primary.*

———. *Probability.* Illustrated by Wendy Watson. A Young Math Book. Crowell, 1972, 33 pp., $3.75. Grades 6-8.

Suggestions and directions for experiments in probability using thumbtacks, coins, a cuboctahedron, and colored chips for organizing the results and for using the results to make predictions.

_____. *Puzzles, Patterns, and Pastimes.* Illustrated by Lou Myers. World of Mathematics Series. Doubleday, 1969, 136 pp., $3.95. Grades 5-8.

An excellent collection of mathematical puzzles, cleverly illustrated, with answers.

Lownenstein, Dyno. *Graphs, a First Book.* Watts, 1969, 63 pp., $3.75. Grades 6-9.

Good reference book on line, bar, and circle graphs, and pictographs. In each section there are many types of graphs to be read and explanations of how graphs are constructed for given relevant data. There is also a discussion of the use of the decimal ruler and of whether graphs can lie.

Loyd, Sam. *The Eighth Book of Tan.* Introduction and solutions by Peter Van Note. Dover, 1968, 52 pp., $1.25, paper. Grades 6-9.

A collection of 700 tangrams with solutions. Introduction contains some history of tangrams and other puzzles.

Lukacs, Clara, and Emma Tarján. *Mathematical Games.* Translated from the Hungarian by John Dobai. Diagrams by J. Varga and E. Tokáts. Illustrated by L. Rébar and S. Gëro. Walker, 1968, 200 pp., $4.95. Grades 6-9.

An excellent collection of games, puzzles, problems, and tricks.

MacAgy, Douglas, and Elizabeth MacAgy. *Going for a Walk with a Line.* See *Primary.*

McCall's Sewing Book. Random, 1968, 308 pp., $6.95. Grades 6-9.

Provides application of concepts of geometry, measurement, and other mathematical ideas pertaining to different types and sizes of the human figure.

McCloskey, Robert. *Time of Wonder.* Viking, 1957, 63 pp., $3.95. Grades 4-6.

A description of the change of seasons on an island in Penobscot Bay makes wide use of the vocabulary of measurement and comparison.

Malter, Morton S. *Our Largest Animals.* See *Primary.*

_____. *Our Tiniest Animals.* See *Primary.*

Massoglia, Elinor. *Fun-Time Paper Folding.* Illustrated by George Rhoads. Childrens, 1959, 31 pp., $2.75. Grades 4-6.

Using elementary language of comparison and shape, the author describes Japanese methods of making a sailboat, a fish, a swan, a basket, a flying bird, and other objects—all without resorting to cutting or pasting.

Moore, Lilian. *The Important Pockets of Paul.* Illustrated by William D. Hayes. McKay, 1954, 73 pp., $2.75. Grades 4-5.

Several stories tell about Paul's pockets, which are important to him because of the things they hold. He learns about a plumb line and perpendicular heights, and he makes a plumb line with a top and string from his pockets. The language of position, time, and number is employed.

Murray, William D., and Francis J. Rigney. *Paper Folding for Beginners.* See *Primary.*

Navarra, John Gabriel. *Clocks, Calendars, and Carousels.* Illustrated by Al Nagy. Doubleday, 1967, 64 pp., $4.70. Grades 5-8.

A well-told and interestingly pictured story of man's efforts to measure time.

Neal, Harry E. *The Story of the Kite.* Illustrated by John Moment. Vanguard, 1954, 61 pp., $3.95. Grades 4-6.

The history and uses of kites are described. The directions given for making them require elementary concepts of measurement and geometry.

Newell, Homer E., Jr. *Space Book for Young People.* Rev. ed. Illustrated by Anne Marie Jauss. McGraw, 1968, 114 pp., $4.72. Grades 4-8.

Galaxies, comets, asteroids, artificial satellites, and their place in the universe are discussed. Ideas of number, measurement, and comparison are used.

Nohelty, Sally, compiler. *Eleven and Three Are Poetry.* See Young Owl Books, *Primary.*

Norman, Gertrude. *The First Book of Music.* Illustrated by Richard Gackenbach. Watts, 1954, 65 pp., $3.75. Grades 4-6.

In addition to a brief description of early music and musical instruments and a list of good music on records, this book contains a few pages illustrating the application of mathematics to music in the study of rhythm and the building of melodies.

O'Brien, Thomas C. *Odds and Evens.* See *Primary.*

Oldfield, Ruth L. *The True Story of Albert Einstein, Man of Science.* Drawings by Parviz Sadinghian. Childrens, 1964, 143 pp., $4.50. Grades 5-9.

A biography emphasizing the scientific influence and humanitarianism of Albert Einstein. Each chapter is introduced with a quotation from his "Autobiographical Notes."

Paradis, Adrian A. *The Bulls and the Bears: How the Stock Exchange Works.* Drawings by Alan Moyler. Hawthorne, 1967, 94 pp., $4.25. Grades 5-7.

A story of a company from its beginning to its eventual listing on a stock exchange is used to explain the working of a stock exchange.

Parker, Bertha Morris. *Golden Book of Science.* Illustrated by Harry McNaught. Golden, 1963, 98 pp., $3.95. Grades 4-6.

This book contains much material that uses concepts of comparison and measurement. There are special sections on time, size, rate, distance, and temperature.

Perkins, Wilma Lord. *Fannie Farmer Junior Cook Book.* Illustrated by Martha Powell Setchell. Little, 1957, 208 pp., $4.95. Grades 5-8.

Simple and clear directions for 120 useful recipes requiring inexpensive ingredients. Equivalent liquid and dry measurements and fractions are among the mathematical ideas used.

Phillips, Jo. *Right Angles: Paper Folding Geometry.* Illustrated by Giulio Maestro. A Young Math Book. Crowell, 1972, 33 pp., $3.75. Grades 4-6.

Suggested activities introduce these geometric figures and some of their properties: right angle, rectangle, square, quadrilateral, and nonright angle.

Pine, Tillie S., and Joseph Levine. *The Chinese Knew.* See *Primary.*

Podendorf, Illa. *Animals and More Animals.* See *Primary.*

_____. *How Big Is a Stick?* See *Primary.*

_____. *Many Is How Many?* See *Primary.*

Ravielli, Anthony. *The World Is Round.* Viking, 1963, 48 pp., $3.37. Grades 5-8.

Description and illustrations of the history of thought about the shape of the earth.

Razzell, Arthur G., and K. G. O. Watts. *Probability: The Science of Chance.* Illustrated by Ellen Raskin. Doubleday, 1967, 47 pp., $3.25. Grades 5-8.

A well-illustrated text that uses interesting situations to show how even-chance events fall into patterns and how these patterns form the basis for prediction. Some exercises are suggested.

———. *This Is 4: The Idea of a Number.* Illustrated by Ellen Raskin. Doubleday, 1967, 47 pp., $3.25. Grades 5-8.

Fourness is used as a means to introduce quadrilaterals and other related geometric ideas such as area and its measure. Section on magic squares, tangrams, and other unusual puzzles.

Rees, Elinor. *At the Bank.* See *Primary.*

Ripley, Elizabeth. *Leonardo da Vinci.* Walck, 1952, 67 pp., $5.25. Grades 4-8.

A text closely related to a varied selection of Leonardo's works. Designs for some of his machines and inventions are included.

Rogers, James T. *Story of Mathematics for Young People.* Design by Will Burtin. Pantheon, 1966, 127 pp., $4.95. Grades 5-9.

The text and numerous pictures telescope the history of mathematics into an understandable visual story. The accomplishments of great mathematicians in relation to the cultures in which they lived is a highlight of this easy-to-read book.

Roper, Susan. *Paper and Pencil Geometry.* The Franklin Mathematics Series. Franklin, 1968, 104 pp., $1.80, paper. Grades 4-6.

An excellent workbook of the do-it-yourself type. It includes supplementary materials that help in the investigation of ideas such as these: circle, quadrilateral, triangle, point, curve, line, ray, angle, perimeter, area, cube, prism, and cylinder.

Rossetti, Christina. *Adding: A Poem.* See Young Owl Books, *Primary.*

Rothman, Joel, and Ruthven Tremain. *Secrets with Ciphers and Codes.* Macmillan, 1969, 32 pp., $3.95. Grades 5-7.

Ten different codes are given, from easy to hard, with exercises in encoding and deciphering secret messages. Answers included.

Russell, Solveig Paulson. *Lines and Shapes.* See *Primary.*

———. *One, Two, Three and Many: A First Look at Numbers.* See *Primary.*

———. *Size, Distance, Weight: A First Look at Measuring.* Illustrated by Margot Tomes. Walck, 1968, 48 pp., $4.25. Grades 4-6.

Explanations, based on familiar situations, of many different ways we measure, how and why we measure, and the tools we use in measuring distance, weight, volume, time, and heat. Some special measures and the metric system are also briefly discussed.

Sarasas, Claude. *The A B C's of Origami.* Tuttle, 1964, 55 pp., $2.95. Grades 4-6.

Pictured instructions for folding a square of paper into an object for each letter of the alphabet. The objects are named in English, French, and Japanese.

Schloat, G. Warren, Jr. *Adventures of a Letter.* Scribner, 1949, 48 pp., $4.05. Grades 4-5.

Number, time, distance, and money are ideas used as a letter travels from Los Angeles, California, to White Plains, New York.

Schneider, Herman, and Nina Schneider. *How Big Is Big?* Illustrated by A. F. Arnold. A-W, 1946, 42 pp., $3.85. Grades 4-6.

Sizes of many things are compared as a child relates himself to elephants, mountains, stars, mice, fleas, and atoms.

Schwartz, Julius. *I Know a Magic House.* Illustrated by Marc Simont. McGraw, 1956, 32 pp., $3.83. Grades 4-6.

The wonders of everyday living are described: water comes right into the house, we are warmed by fire not in the room, music comes to our home by wire, and so on. Ideas of number, measurement, and position are used.

Scripture, Nicholas E. *Fifty Mathematical Puzzles and Oddities.* Van Nostrand, 1963, 84 pp., $2.50. Grades 5-8.

A collection of fifty oddments with new approaches, classified under arithmetic, algebra, geometry, and miscellaneous; all with answers.

Selfridge, Oliver G. *Fingers Come in Fives.* See *Primary.*

Shay, Arthur. *What Happens When You Put Money in the Bank.* See *Primary.*

Simon, Leonard. *Counting Lightly.* See Young Owl Books, *Primary.*

_____. *The Day Numbers Disappeared.* See *Primary.*

_____. *Stretching Numbers.* See Young Owl Books, *Primary.*

Sitomer, Mindel, and Harry Sitomer. *Circles.* Illustrated by George Giusti. A Young Math Book. Crowell, 1971, 33 pp., $3.75. Grades 5-7.

Development, by use of compass and straight edge, of some properties of a circle such as: angle inscribed in a semicircle is a right angle, and segments the length of the radius make a hexagon which is regular.

———. *What Is Symmetry?* Illustrated by Ed Emberley. A Young Math Book. Crowell, 1970, 33 pp., $3.75. Grades 4-6.

Line, point, and plane symmetry are well illustrated with drawings.

Smith, David Eugene, *Number Stories of Long Ago.* NCTM, 1969 reprint as one of the Classics in Mathematics Education, 152 pp., $5.50. Grades 5-8.

A famous historian relates the history of number, counting, and computing. He also includes some oddities and puzzles.

Smith, David Eugene, and Jekuthiel Ginsburg. *Numbers and Numerals.* NCTM, 1937, 52 pp., $1.10. Grades 5-8.

How our number system came into use, how some of the numerals came to have their present shape, how different number scales were used, how numbers were named, and interesting sections entitled "Mystery of Numbers" and "Number Pleasantries" are included in this book.

Smith, George O. *Mathematics: The Language of Science.* Putnam, 1961, 72 pp., $2.95. Grades 5-8.

A brief history of a few important developments in mathematics that have affected science.

Soong, Maying. *The Art of Chinese Paper Folding.* Harcourt, 1948, 132 pp., $3.75. Grades 4-8.

Clear instructions and simple diagrams for constructing, without scissors and paste, such objects as hats, dollhouse furniture, Christmas-tree ornaments, and boats. The descriptions use many geometric terms and units for the measurement of length.

Sootin, Laura. *Let's Go to a Bank.* Illustrated by Barbara Corrigan. Putnam, 1957, 47 pp., $2.65. Grades 4-6.

Bank activities are depicted through a visit to a teller's window, safe-deposit boxes, and vaults, and an explanation is given of checking and savings accounts.

Srivastava, Jane Jonas. *Computers.* Illustrated by James and Ruth McCrea. A Young Math Book. Crowell, 1972, 33 pp., $3.75. Grades 4-7.

Simple language and clever drawings explain in an interesting way what a computer is, how it is used, language used, what a programmer does, use of a flow chart. Some intriguing questions are left for the reader to answer.

———. *Weighing and Balancing.* See *Primary.*

Stonaker, Frances Benson. *Famous Mathematicians.* Lippincott, 1966, 118 pp., $3.95. Grades 4-8.

Brief biographies of Euclid, Archimedes, Aryabhatta, Al-Khowarizmi, Descartes, Newton, Lagrange, Gauss, Galois, von Neumann, and Wiener, showing that mathematics was an exciting adventure to these men.

Strimban, Jack, and Robert Strimban. *Optical Illusions.* See Wise Owl Books. Grades 4-6.

A book of pictures presenting optical illusions, with a very simple question about each.

Tani, Yukio. *The Magic Calculator: The Way of Abacus.* Japan, 1964, 64 pp., $1.00.Grades 4-8.

History of the Japanese abacus as a calculator and an exploration of how it is used. Exercises with answers.

Tannenbaum, Beulah, and Myra Stillman. *Understanding Maps.* McGraw, 1969, 144 pp., $5.72. Grades 5-8.

The problems of mapping the land, the sea, and the sky are discussed; and ideas of scale drawing, comparison, and measurement are applied.

Tarshis, Barry. *Barter, Bills and Banks.* Illustrated by Ric Tarshis. Messner, 1970, 80 pp., $3.64. Grades 5-9.

Traces the development of money and discusses supply and demand, profit and loss, inflation, banks, federal reserve system, credit cards, and checking accounts. Excellent reference. Index included.

Terry, Leon. *The Mathmen.* McGraw, 1964, 222 pp., $3.95. Grades 6-8.

Contribution of nine men to mathematics—Thales, Pythagoras, Plato, Eudoxus, Aristotle, Euclid, Archimedes, Eratosthenes, and Hipparchus—and three famous problems: trisecting the angle, doubling the cube, and squaring the circle.

Thurber, James. *The Great Quillow.* Illustrated by Doris Lee. Harcourt, 1944, 54 pp., $4.95. Grades 4-6.

A toymaker saves his fellow townsmen from a giant. This original and ingenious fairy tale utilizes concepts of number, measurement, and comparison.

_____. *Many Moons.* Illustrated by Louis Slobodkin. Harcourt, 1943, 42 pp., $3.75. Grades 4-5.

A little princess wants the moon. This fantasy tells how her wish comes true, making use of ideas of number, measurement, and comparison.

Valens, E. G. *Motion.* Photographs by Bernice Abbott. World, 1965, 96 pp., $4.21. Grades 6-9.

Description and explanation that uses simple experiments to refute the ancient beliefs regarding motion, and to duplicate Galileo's and Newton's experiences which resulted in the three Laws of Motion.

_____. *The Number of Things: Pythagoras, Geometry and Humming Strings.* Dutton, 1964, 189 pp., $4.95. Grades 5-8.

The fascinating story of the search by the Pythagoreans for the designs that hold together geometry, music, nature, and other aspects of the world.

Werner, Elsa Jane. *The Golden Book of Geography.* Golden, 1964, 96 pp., $2.99. Grades 4-6.

Comparison of size and ideas of time developed in relation to day and night and to time zones; a colorful and informative book.

Weyl, Peter. *Men, Ants, and Elephants: Size in the Animal World.* Illustrated by Anthony Ravielli. Viking, 1959, 103 pp., $3.37. Grades 5-8.

The comparative aspect of measurement and the arbitrary nature and importance of standard units of measurement are given significance through a discussion of size in the animal world.

Wilcox, Louise K., and Gordon E. Burks. *What Is Money?* Illustrated by Betsy Warren. Steck, 1959, 48 pp., $2.95. Grades 4-7.

The origin and development of money, its exchange for goods, and how it is earned, saved, and invested.

Willerding, Margaret F. *From Fingers to Computers.* The Franklin Mathematics Series. Franklin, 1968, 102 pp., $3.15. Grades 6-8.

Interesting supplementary mathematical material presented by do-it-yourself activities. Included are finger calculation, use of the abacus, and the construction and use of Napier's bones and a slide rule. An introduction to computers is followed by activities making use of flow charts and the binary numeration system.

_____. *Mathematics Around the Clock.* The Franklin Mathematics Series. Franklin, 1968, 96 pp., $3.15. Grades 5-6.

Interesting supplementary mathematical activities with many do-it-yourself activities for exceptional children. Modular-twelve arithmetic is simply developed followed by Mod 7, Mod 5, and Mod 6 with the properties of each system investigated.

Wise Owl Books. Holt, 1965, $59.96 per set. Individual titles at $2.97 each. Grades 4-6.

A set of twenty books for an individualized supplementary reading program. The following five books relate to mathematics: *Dr. Frick and His Fractions*, by Henry W. Ford; *I've Got Your Number, John*, by Olive S. Berg; *Millions of People*, by Thomas Dripdale and John Dunworth; *Number Patterns Make Sense*, by Howard F. Fehr; and *Optical Illusions*, by Jack and Robert Strimban.

Wright, H. R. *Four Threes Are 12*. See Young Owl Books, *Primary*.

———. *A Maker of Boxes*. See Young Owl Books, *Primary*.

Young Owl Books. See *Primary*.

Zarchy, Harry. *Let's Make a Lot of Things*. Knopf, 1948, 160 pp., $4.49. Grades 6-8.

Easy-to-follow step-by-step instructions and clearly drawn diagrams describe the making of earrings, bracelets, rings, masks, and ash trays. An understanding of and ability to apply concepts of measurement are needed.

———. *Let's Make Something*. Knopf, 1943, 160 pp., $4.49. Grades 4-7.

Mathematical concepts are needed to make the objects of wood, clay, plastic, soap, paper, wax, glass, and metal described by Mr. Zarchy.

———. *Wheel of Time*. Illustrated by Rene Martin. Crowell, 1957, 133 pp., $3.75. Grades 6-8.

This book is designed to make the reader aware of the concept of time, its importance in our lives, and devices man has invented to measure it. Amusing clocks and time-keeping devices are described.

Zim, Herbert S., *Codes and Secret Writing*. Morrow, 1948, 154 pp., $3.95. Grades 6-8.

Boys will find this introductory book on codes very challenging. One section is devoted to the use of multiplication for devising and breaking codes.

———. *The Sun*. Illustrated by Larry Kettelkamp. Morrow, 1953, unpaged, $3.75. Grades 4-7.

Ideas of number, comparison, size, weight, distance, and temperature are used in this elementary discussion of the sun.

———. *The Universe*. Morrow, 1961, 64 pp., $3.75. Grades 4-6.

Easy-to-read text and pictures about the universe. Helps to develop the idea of use of large numbers and the ideas of comparison, measurement, and the geometry of space.

Junior High School

Abbott, E. A. *Flatland.* Dover, 1950, 128 pp., paper, $1.00. Grades 7-8.

This is an imaginative tale that takes the reader into one-dimensional and two-dimensional worlds and into further speculation about dimensions.

Adler, Irving. *The Giant Golden Book of Mathematics.* See *Intermediate.*

_____. Inside the Nucleus. Day, 1963, 191 pp., $5.95. Grades 7-8.

An examination of the composition of atoms, nuclei, and other particles, showing some uses of mathematics.

_____. *Logic for Beginners.* Illustrated by Ruth Adler. Day, 1964, 158 pp., $4.29. Grades 7-8.

Examines how to draw a conclusion from what is known and how to arrive at reasons for a known conclusion. Games, jokes, and puzzles are used as illustrations. Brain teasers with answers.

_____. *Magic House of Numbers.* See *Intermediate.*

_____. *Mathematics: The Story of Numbers, Symbols, and Space.* Illustrated by Lowell Hess. Golden, 1960, 55 pp., $3.95. Grades 7-8.

A brief treatment of such topics as number, symbols, regular polygons, mathematics in nature, mathematics and music, and probability, to show the scope of mathematics.

_____. *New Look at Arithmetic.* Diagrams by Ruth Adler. Day, 1964, 309 pp., $8.50. Grades 7-8.

A reference book on natural numbers, integers, rational numbers, and real numbers. Exercises with answers.

_____. *The New Mathematics.* Illustrated by Ruth Adler. Day, 1958, 187 pp., $5.95. Grade 8.

Discussion of our number system as it has grown from the integers used for counting through rational numbers and real numbers to the complex numbers.

_____. *Probability and Statistics for Everyman.* Diagrams by Ruth Adler. Day, 1963, 256 pp., $7.95. Grades 7-8.

Discussion of how to understand and use laws of chance. Some pupils with knowledge of algebra can read all of the book; others can read parts.

_____. *Thinking Machines.* Illustrated by Ruth Adler. Day, 1961, 189 pp., $5.95. Grades 7-8.

An introduction to the theory of computers for bright junior high school pupils. The ideas range from notions of number to Boolean algebra and logic as these relate to computers.

_____. *Time in Your Life.* See *Intermediate.*

_____. *The Tools of Science: From Yardstick to Cyclotron.* Illustrated by Ruth Adler. Day, 1958, 128 pp., $3.50. Grades 7-8.

Man measures, analyzes, and changes his universe through instruments that measure, weigh, listen to, break, sift, mix, heat, and freeze things.

Anderson, John T., and C. T. Ogilvy. *Excursions in Number Theory.* Oxford, 1966, 167 pp., $5.00. Grades 7-8.

Challenging ideas and problems for very bright junior high school pupils who are inquisitive. Considers new uses of number theory and fresh approaches to old problems.

Anderson, Raymond W. *Romping through Mathematics.* Illustrated by Harry Zarchy. Knopf, 1947, 160 pp., $4.99. Grades 7-8.

Describes the invention of methods of counting and measuring, with chapters on arithmetic, algebra, geometry, logarithms, probabilities, trigonometry, analytic geometry, and calculus.

Andrews, F. Emerson. *Numbers, Please.* See *Intermediate.*

Andrews, W. S., et al. *Magic Squares and Cubes.* Dover, 1960, 419 pp., paper, $3.00. Grades 7-8.

A detailed series of essays on the construction and properties of magic squares, cubes, and figures of other shapes. Many of the less-well-known types are described and analyzed mathematically.

Asimov, Isaac. *Breakthroughs in Science.* Houghton, 1960, 197 pp., $4.50. Grades 7-8.

Brief, terse biographies of people famous for their contribution toward progress in knowledge. Among these are Archimedes, Galileo, Newton, and Einstein.

_____. *The Clock We Live On.* Illustrated by John Bradford. Abelard, 1965, 160 pp., $3.50. Grades 7-8.

A comprehensive story of time, reflecting thousands of years of human effort.

_____. *An Easy Introduction to the Slide Rule.* Houghton, 1965, 187 pp. $3.50. Grades 7-8.

Explanation of the basic scales on standard slide rules for addition, subtraction, multiplication, and division, as well as more complicated scales such as those for squaring and cubing.

_____. An Easy Introduction to the Slide Rule. Fawcett, 1967, 160 pp., $0.60, paper. Grades 7-9.

A clearly written and illustrated introduction to the standard slide rule. Introduces the ideas of addition by means of two rulers, logarithms, the scales used for multiplication, folded scales, and scales for powers and roots.

_____. *Quick and Easy Math.* See *Intermediate.*

_____. *Realm of Measure.* Houghton, 1960, 186 pp., $3.95. Grades 7-8.

Relates the development of measurement from the origin of various units and their standardization and conversion factors to an interesting analysis of the "dimension" of complex units of length, mass, and time.

_____. *Realm of Numbers.* Diagrams by Robert Belmore. Houghton, 1959, 200 pp., $3.50. Grades 7-8.

The story of the development of number ideas and of difficulties in symbolizing them. Extends from the concept of ten or less to the concept of infinitely many.

_____. *Science, Numbers, and I.* Doubleday, 1968, 226 pp., $4.95. Grades 7-9.

An interesting series of essays on a variety of subjects. Those in the section on "number" deal with the ratios in musical scales and harmony, the statistics of great rivers and cities, antipodal points on the earth, the paradoxes of time created by traveling across the date line, and number mysticism.

Bakst, Aaron. *Mathematical Puzzles and Pastimes*. Van Nostrand, 1954, 206 pp., $6.95. Grades 7-8.

Elementary mathematics presented with a light touch through a large variety of mathematical recreations with solutions.

_____. *Mathematics, Its Magic and Mastery*. Van Nostrand, 1967, 700 pp., $8.75. Grades 7-8.

A wealth of material about elementary mathematics is presented with amusing illustrations.

Barnard, D. St. P. *A Book of Mathematical and Reasoning Problems: Fifty Brain-Twisters*. See *Intermediate*.

_____. *One Hundred Brainteasers*. See *Intermediate*.

Barr, Stephen. *Experiments in Topology*. Crowell, 1964, 240 pp., $3.75. Grades 7-8.

Encourages the reader to experiment with the Klein bottle, Moebius strip, projective plane, map coloring, Koenigsberg bridges, and other topological ideas. Written and illustrated in an interesting way.

_____. *A Miscellany of Puzzles, Mathematical and Otherwise*. Crowell, 1965, 166 pp., $3.50. Grades 7-8.

A varied and delightful collection of 62 puzzles to be solved by folding or cutting paper; with pencil and paper; with the use of arithmetic, algebra, or geometry; or by common sense. Answers that provide insight into method are included.

Beckhard, Arthur. *Albert Einstein*. Illustrated by Charles Beck. Putnam, 1959, 126 pp., $3.69. Grades 7-8.

The life of the great mathematician-scientist, who played an important part in creating the atomic age, discussed simply and effectively.

Bell, Eric T. *Men of Mathematics*. Simon, 1937, 592 pp., $7.95; paper, $3.95. Grades 7-8.

Biographies of men who have invented and influenced mathematics.

Bell, Thelma. *Snow*. See *Intermediate*.

Bell, Thelma, and Corydon Bell. *The Riddle of Time*. Viking, 1963, 157 pp., $3.50. Grades 7-8.

An interesting account of many aspects of time, man's grasp of its significance, his efforts to measure it, and, finally, its relation to the theory of relativity.

Berrick, Jeanne. *Archimedes and the Door of Science*. See *Intermediate*.

———. *How Much and How Many*. See *Intermediate*.

Berrick, Jeanne, and Marcia O. Levine. *Mathematics Illustrated Dictionary*. See *Intermediate*.

———. *Take Shapes, Lines, and Letters*. See *Intermediate*.

Bergamini, David, and the Editors of *Life*. *Mathematics*. Time, 1970, 200 pp., $5.70. Grades 7-8.

Survey of the history of some aspects of mathematics, including its role in art and nature. Chapters are devoted to the calculus, probability and chance, topology, and outstanding mathematicians.

Berger, Melvin. *For Good Measure*. Illustrated by Adolph E. Brotman. McGraw, 1969, 160 pp., $4.72. Grades 7-9.

A history of the progress of refining the accuracy of measurement in relation to scientific and technological progress. Separate chapters are devoted to measurement of length, mass, time, temperature, sound, light, electricity, and radiation.

Brahe, William, and G. De Santillana. *The Universe of Galileo and Newton*. Harper, 1964, 153 pp., $5.49. Grades 7-8.

Biographies of two scientists to whom modern scientists are indebted. Mathematics is the basis of their work.

Boehm, George A.W., and the Editors of *Fortune*. *The New World of Mathematics*. Dial, 1959, 128 pp., $3.50. Grades 7-8.

Bright children will be interested in this book about the nature of mathematics, computers as mathematical-logical machines, and techniques of modern mathematics.

Bolton, Sarah. *Famous Men of Science*. Illustrated by Constance Naar. Crowell, 1960, 308 pp., $3.95. Grades 7-8.

Short biographies of men who have contributed to the development of mathematics, including Copernicus, Galileo, Newton, and Einstein.

Bowers, Henry, and Joan E. Bowers. *Arithmetical Excursions: An Enrichment of Elementary Mathematics*. See *Intermediate*.

Bragdon, Lillian J. *Tell Me the Time, Please*. See *Intermediate*.

Brandwein, Paul F., and Hy Ruchlis. *Invitations to Investigate.* Harcourt, 1970, 159 pp., $4.95. Grades 7-9.

A sequence of investigations is proposed to help the readers appreciate the nature of scientific proof. Includes discussions of the use of simple measurements and combinations of measurements in such investigations and of the contrast in scientific proof and mathematical validity.

Branley, Franklin M. *The Milky Way: Galaxy Number One.* Illustrated by Helmut K. Wimmer. Crowell, 1969, 144 pp., $4.50. Grades 7-9.

A history of theories about and knowledge of our galaxy. The mathematical interest centers in the attempts to calculate distance, mass, density, etc., and the refinement of these calculations. Full understanding requires the use of scientific notation and logarithms.

Brindze, Ruth. *The Story of Our Calendar.* See *Intermediate.*

Brooke, Maxey. *150 Puzzles in Crypt-Arithmetic.* See *Intermediate.*

Broudy, Rose L. *Modern Math Made Easy.* See *Intermediate.*

Buff, Mary, and Conrad Buff. *Big Tree.* See *Intermediate.*

Carona, Philip B. *Things That Measure.* See *Intermediate.*

Charosh, Mannis. *The Ellipse.* See *Intermediate.*

Chester, Michael. *Relativity: An Introduction for Young Readers.* Illustrated by Henri Fluchère. Norton, 1967, 158 pp., $3.73. Grades 8-9.

A two-part discussion, one descriptive and the other mathematical. Bibliography included.

Clark, Frank. *Speed Math.* Watts, 1968, 123 pp., $3.95. Grades 7-9.

Suggestions for techniques and practice exercises to improve speed of calculation. Checking using "digit sums" and numeration in other bases are included.

Clark, Mary Lou. *You and Relativity.* Illustrated by Bill Sanders. Childrens, 1965, 61 pp., $3.00. Grades 7-8.

Develops the idea that position, size, speed, and time are relative.

Coggins, Jack. *Flashes and Flags.* Dodd, 1963, 88 pp., $3.25. Grades 7-9.

History and uses of various methods of signalling such as smoke, drums, lights, semaphores, Morse telegraph code, storm flags, and sports hand signals.

Court, Nathan A. *Mathematics in Fun and Earnest.* Dial, 1958, 250 pp., $4.75. Grades 7-8.

Among the essays in this book of interest to superior junior high school mathematics students are "The Vagaries of the Infinite," "Geometrical Magic," "Famous Problems," and "The Might and Plight of Reasoning."

Cowan, Harrison J. *Time and Its Measurement.* World, 1958, 160 pp., $5.95. Grades 7-8.

History of the measurement of time and the development of timepieces.

Davidson, Jessica, and William C. Martin. *Mind in a Maze.* See *Intermediate.*

Davis, Barbara. *Learning Science through Cooking.* See *Intermediate.*

Davis, Philip J., and William G. Chinn. *3.1416 and All That.* Simon, 1969, 184 pp., $5.95. Grades 7-9.

A series of twenty-four enlightening and entertaining essays on selected mathematical ideas placed in a historical setting. One essay is concerned with π and its decimal symbolization.

Degrazia, Joseph. *Math Is Fun.* See *Intermediate.*

DeLacy, Estelle. *Euclid and Geometry.* Watts, 1963, 120 pp., $4.50. Grades 7-8.

A simply written biography of Euclid and a discussion of the first geometry book, Greek geometry after Euclid, and non-Euclidean geometries.

Denholm, Richard A. *Mathematics: Man's Key to Progress, Book A.* See *Intermediate.*

———. *Mathematics: Man's Key to Progress, Book B.* Franklin Mathematics Series. Franklin, 1968, 104 pp., $3.15. Grades 7-8.

Self-directed, supplementary learning activities about the history of mathematics, presented in picture and prose followed by do-it-yourself, related activities. For example, an interesting discussion of the contribution of Leonard Euler (1707-1783) is followed by suggestions for making and investigating the Möbius strip and for investigating the four-color problem.

Diggins, Julia E. *String, Straightedge, and Shadow: The Story of Geometry.* See *Intermediate.*

Dilson, Jesse. *The Abacus: A Pocket Computer.* See *Intermediate.*

Dudeney, Henry E. *Amusements in Mathematics.* Rev. ed. Dover, 1958, 258 pp., paper, $2.50. Grades 7-8.

About four hundred puzzles, problems, paradoxes, and brain teasers, both old and new, classified under such topics as arithmetic, algebra, geometry, and games.

Emmet, E. R. *Brain Puzzler's Delight.* See *Intermediate.*

Epstein, Beryl, and Sam Epstein. *The First Book of Measurement.* See *Intermediate.*

Fahnestock, James D. *Computers and How They Work.* Barnes, 1959, 228 pp., $5.95. Grades 7-8.

Explains in a somewhat simple way what computers do, their language, the arithmetic they use, programming, computer logic circuitry, how men and machines communicate, how computers remember, and two types of computers.

Fenton, Carroll L., and Mildred A. Fenton. *Worlds in the Sky.* See *Intermediate.*

Feravolo, Rocco. *Wonders of Mathematics.* See *Intermediate.*

Fletcher, Helen Jill. *Put On Your Thinking Cap.* See *Intermediate.*

Forsee, Aylesa. *Albert Einstein: Theoretical Physicist.* Macmillan, 1963, 202 pp., $5.95. Grades 7-8.

The story of the student and adult years of Einstein, emphasizing the dedication with which he sought solutions to scientific problems, the high regard in which the scientific community held him, and, above all, his great humility.

Fowler, H. Waller, Jr. *Kites.* See *Intermediate.*

Freeman, Mae Blacker. *The Story of Albert Einstein.* See *Intermediate.*

Freeman, Mae Blacker, and Ira Freeman. *Fun with Astronomy.* See *Intermediate.*

———. *Fun with Figures.* See *Intermediate.*

Friedland, Aaron J. *Puzzles in Math and Logic.* Dover, 1970, 66 pp., $1.35. Grades 7-9.

One hundred original puzzles with solutions that use ideas such as logic, probability, properties of number, and combinatorics. The puzzles are of varying difficulty.

Friend, J. Newton. *Numbers: Fun and Facts.* Scribner, 1954, 208 pp., $5.95. Grades 7-8.

A collection of mathematical oddities, curiosities, puzzles, and problems.

Frohlichstein, Jack. *Mathematical Fun, Games and Puzzles.* See *Intermediate.*

Galt, Tom. *Seven Days from Sunday.* See *Intermediate.*

Gamow, George, and Marvin Stern. *Puzzle-Math.* Viking, 1958, 119 pp., $3.75. Grades 7-8.

A series of mathematical brain twisters in story form.

Gardner, Martin. *Martin Gardner's New Mathematical Diversions from Scientific American.* Simon, 1966, 253 pp., $5.95. Grades 7-9.

A rich collection of interesting and challenging mathematical puzzles. Some of the puzzles are concerned with binary magic, group theory and braids, four-color map problem, confirming the Pythagorean theory by paper cutting, and exploring properties of an ellipse by paper folding. Answers and references for further study are included.

———. *Mathematics, Magic, and Mystery.* Dover, 1956, 176 pp., paper, $1.50. Grade 8.

The how and why of mathematical tricks with cards, dice, coins, knots, geometrical vanishing illusions, and of other tricks arising from the application of topology, probability, set theory, and theory of numbers.

———. *Perplexing Puzzles and Tantalizing Teasers.* See *Intermediate.*

———. *Science Puzzlers.* Illustrated by Anthony Ravielli. Viking, 1960, 127 pp., $3.37. Grades 7-8.

Easy experiments, old and new, from which children can learn about science. One section contains 21 mathematical experiments.

———. *The Scientific American Book of Mathematical Puzzles and Diversions.* Simon, 1964, 178 pp., $5.95; paper, $1.45. Grades 7-8.

A variety of puzzles, games, and problems involving probability, paradoxes, flexagrams, topological curiosities, and magic squares.

———. *Space Puzzles.* Illustrated by Ted Schroeder. Simon, 1971, 95 pp., $4.95. Grades 7-9.

Basic information about the solar system presented in a format that first gives a brief introduction followed by intriguing questions—some serious and some just for fun—under headings such as earth, moon, sun, major planets, and space flights. Designed to help develop and apply concepts of measurement and of the geometry of space. Answers and an index are included.

———. *The Unexpected Hanging and Other Mathematical Diversions.* Simon, 1969, 255 pp., $5.95. Grades 7-9.

Puzzles that approach mathematics in a spirit of fun provide a basis for discussion in areas of mathematics that are nontrivial such as logic, probability, and simple topological ideas.

Gardner, Martin, ed. *The Second Scientific American Book of Mathematical Puzzles and Diversions.* Simon, 1960, 253 pp., $6.95. Grades 7-9.

Similar to the first book. Includes a variety of puzzles involving logic, probability, number theory, flexagrams, topological curiosities, soma cubes, and golden ratio. Answers and bibliography included.

Greenhood, David. *Mapping.* Illustrated by Ralph Graeter. University of Chicago, 1964, 521 pp., $6.00; paper, $2.95. Grades 7-8.

An excellent book to help users of maps understand and appreciate them. Numerous applications of arithmetic and geometry used in discussions of distance, direction, projections, and surveying.

Haas, Victor E. *The Magic Numerals of Ali Khayyan.* See *Intermediate.*

Haber, Heinz. *Stars, Men, and Atoms.* Golden, 1962, 188 pp., $3.95. Grades 7-8.

The final chapter provides some insight into the geometry of four dimensions as it relates to the question of whether the universe is finite or infinite.

Halacy, Dan. *Charles Babbage—Father of the Computer.* Macmillan, 1970, 170 pp., $4.95. Grades 7-9.

A concise but well-told story of the life of a man who conceived, designed, and began building in 1820, a calculating machine that could have advanced the computer age 100 years. His machine could be programmed in advance, had a large memory of numbers, did all work automatically, and printed out answers.

Heafford, Philip. *The Math Entertainer.* Emerson, 1959, 176 pp., $4.95. Grades 7-8.

A set of fifty entertaining quizzes with answers.

Heath, R. V. *Mathemagic.* Dover, 1953, 126 pp., paper, $1.00. Grades 7-8.

A collection of many mathematical tricks, games, and puzzles, with a few examples of magic squares.

Hirsch, S. Carl. *The Globe for the Space Age.* Illustrated by Burt Silverman. Viking, 1963, 88 pp., $3.75. Grades 7-8.

Describes the globe as the best overall representation of the geographical features of the earth and explores the use of the globe in explaining space relations, time, seasons, and weather.

Hogben, Lancelot. *Mathematics in the Making.* Doubleday, 1960, 320 pp., $9.95. Grades 7-8.

Well-illustrated history of mathematics including counting and measurement, our Hindu heritage, the influence of the Greeks and Orientals, and the development of geometry. Some parts are too advanced for junior high school. Excellent reference.

———. *The Wonderful World of Energy.* Doubleday, 1957, 69 pp., $3.95. Grades 8-9.

The description of man's struggle to harness energy shows the significance of mathematical relationships expressed by formulas.

———. *The Wonderful World of Mathematics.* See *Intermediate.*

Holton, Jean Laity. *Algebra: A New Way of Looking at Numbers.* See *Intermediate.*

Hopwood, Robert R. *Science Model Making.* See *Intermediate.*

Horne, Sylvia. *Patterns and Puzzles in Mathematics.* See *Intermediate.*

Hunt, Leslie L. *25 Kites That Fly.* See *Intermediate.*

Hunter, J. A. H. *Fun with Figures.* See *Intermediate.*

———. *More Fun with Figures.* See *Intermediate.*

Hunter J. A. H., and Joseph S. Madachy. *Mathematical Diversions.* See *Intermediate.*

Irwin, Keith G. *The Romance of Weights and Measures.* Viking, 1960, 144 pp., $3.56. Grades 7-8.

The story of the origins and standardization of various units of measure. Stresses the conflict and adjustment between the decimal and nondecimal systems.

Johnson, Donovan A., and William H. Glenn. Exploring Mathematics on Your Own series. See *Intermediate.*

Jonas, Arthur. *More New Ways in Math.* See *Primary.*

Jones, Madeline. *The Mysterious Flexagons.* See *Intermediate.*

Juster, Norman. *The Dot and the Line.* See *Intermediate.*

_____. *The Phantom Tollbooth.* See *Intermediate.*

Karush, William. *The Crescent Dictionary of Mathematics.* Macmillan, 1962, 313 pp., $7.50. Grades 7-8.

An inclusive reference of more than 1,000 entries, covering material on simple arithmetic, elementary geometry, and algebra, as well as more advanced topics in mathematics such as probability and statistics, computers, and operations research. Though prepared for secondary school students, part of it will be useful to students in grades 7 and 8.

Kenyon, Raymond. *I Can Learn about Calculators and Computers.* See *Intermediate.*

Kline, Morris. *Mathematics and the Physical World.* Crowell, 1959, 482 pp., $6.00. Grades 7-8.

The very bright will find this book excellent for reference and for personal study of mathematics and its role in the study of nature. The book ranges from arithmetic through trigonometry, the calculus, and non-Euclidean geometries and shows the simultaneous growth of mathematics and science.

Kohn, Bernice, *Computers at Your Service.* See *Intermediate.*

Kojima, Takashi. *The Japanese Abacus: Its Use and Theory.* Tuttle, 1954, 102 pp., paper, $1.25. Grades 7-8.

A brief history of the abacus, its basic principles, and directions for performing the four fundamental arithmetic operations with an abacus, and many examples and diagrams.

Kondo, Herbert. *Adventures in Space and Time: The Story of Relativity.* Illustrated by George Solonovich. Holiday, 1966, 93 pp., $3.95. Grades 7-9.

An easy-to-read description of the basic ideas of both the special and general theories of relativity and some of the experiments that helped to verify the theories.

———. *Albert Einstein and the Theory of Relativity.* Illustrated by Irene Murray. Watts, 1969, 182 pp., $4.50. Grades 7-9.

A biography that chronicles the most important scientific advancements with personal events in the life of Mr. Einstein.

Kraitchik, Maurice. *Mathematical Recreations.* Dover, 1953, 330 pp., paper, $2.50. Grades 7-8.

Enrichment material on such topics as magic squares, probability, and chess.

Latham, Jean Lee. *Carry On, Mr. Bowditch.* See *Intermediate.*

———. *Trail Blazer of the Seas.* See *Intermediate.*

Leeming, Joseph. *Fun with Puzzles.* See *Intermediate.*

Levinger, Elma Ehrlich. *Albert Einstein.* Messner, 1949, 174 pp., $3.79. Grades 7-8.

A simply written story of Einstein's life describes his accomplishments in science and mathematics as he sought to find why things are as they are.

Lewis, Alfred. *New World of Computers.* See *Primary.*

Lewis, W. D. *Mathematics Makes Sense.* Arco, 1966, 256 pp., $3.95. Grades 7-9.

A development through discussion and exercises of simple propositional algebra limited to "and," and to inclusive and exclusive "or," and combinations. Many other mathematical topics are treated lightly, such as Pascal's triangle, number bases, computers, and large numbers such as 2^{64}. The British style of decimal numeration is used.

Lieber, Lillian R. *The Education of T. C. Mits.* Illustrated by Hugh G. Lieber. Norton, 1944, 230 pp., $4.95. Grades 7-8.

T. C. Mits is The-Celebrated-Man-in-the-Street. As his education is described in verse, mathematical topics are treated in a manner that makes the story and the mathematics exciting.

———. *Infinity.* Illustrated by Hugh G. Lieber. Holt, 1953, 359 pp., $5.95. Grades 7-8.

Infinity is discussed in an interesting manner in an easy-to-read book.

_____. *Mathematics: First Steps.* Illustrated by Hugh Lieber. Watts, 1963, 81 pp., $3.95. Grades 7-9.

A brief look at arithmetic, algebra, geometry, and relativity theory as having all the elements of a game—equipment, action, rules.

_____. *Mits, Wits and Logic.* See *Intermediate.*

_____. *Take a Number: Mathematics for the Two Billion.* Illustrated by Hugh G. Lieber. Ronald, 1946, 221 pp., $3.75. Grades 7-8.

The author very effectively helps the reader make a transfer from the use of arithmetic numbers to algebraic numbers.

Linn, Charles F. *Probability.* See *Intermediate.*

_____. *Puzzles, Patterns, and Pastimes.* See *Intermediate.*

Logsdon, Mayme I. *A Mathematician Explains.* University of Chicago, 1936, 189 pp., $4.00. Grades 7-8.

A description of the mathematics of classical times, indicating the types of problems which led to the development of arithmetic, algebra, geometry, and the calculus, the meaning of these branches in modern life, and their relation to the physical sciences. A good book for students anticipating the study of mathematics in secondary school and college.

Lohberg, Rolf, and Theo Lutz. *Computers at Work.* Drawings by Fidel Nebehostemy. Sterling, 1969, 192 pp., $4.95. Grades 8-9.

Discusses the use of electronic computers—type of computer suitable for a particular task, language used to talk to a computer, how to talk to a computer, and how to make work easier for a computer and the users of computers. A challenge for best students.

_____. *Electronic Brains.* Sterling, 1965, 221 pp., $4.95. Grades 7-8.

A simple and entertaining explanation of the basic mathematics and mechanism of programming for electronic computers.

Lowenstein, Dyno. *Graphs, a First Book.* See *Intermediate.*

Loyd, Sam. *The Eighth Book of Tan.* See *Intermediate.*

Lukács, Clara, and Emma Tarján. *Mathematical Games.* See *Intermediate.*

MacAgy, Douglas, and Elizabeth MacAgy. *Going for a Walk with a Line.* See *Primary.*

McCall's Sewing Book. See *Intermediate.*

Menninger, K. W. *Mathematics in Your World.* Illustrated by Wolfgang Menninger. Viking, 1962, 291 pp., $5.00. Grades 7-8.

Mathematical ideas explained in simple language with familiar problems and illustrations. The book shows that calculation can be an art; it tells of the power of spatial conception and of symbols; and it shows how a simple question may involve a mathematical problem. Valuable enrichment material.

Merrill, Arthur A. *How Do You Use a Slide Rule?* Dover, 1961, 35 pp., paper, $0.75. Grades 7-8.

Ten easy lessons in the use of the slide rule formultiplication and division. Exercises with answers.

Merrill, Helen A. *Mathematical Excursions.* Dover, 1957, 145 pp., paper, $1.50. Grades 7-8.

Ninety problems involving such topics as Russian multiplication, multiplication by doubling, magic squares, dyadic systems, facts about 37, and division by zero.

Meyer, Jerome. *Fun with Mathematics.* Rev. ed. Harcourt, 1961, 176 pp., $2.95. Grades 7-8.

A book of recreational mathematical activities. Some of the sections are "Number Giants," "Mathematical Midgets," "How the Romans Multiplied," "Casting Out Nines," "Triangular Numbers," "Making a Date Indicator," "The Circle," and "The Ellipse."

Moore, Patrick. *Isaac Newton.* Illustrated by Patricia Cullen. Putnam, 1958, 123 pp., $3.49. Grades 7-8.

A biography that gives major attention to Newton's mathematical and scientific findings.

Moore, William. *How Fast, How Far, How Much: The How of Scientific Measurements.* Putnam, 1966, 175 pp., $3.29. Grades 7-9.

An extremely informative account of unusual measurements and the means of determining them. Includes descriptions of the phototimer in timing dashes at track meets, the carbon dating process for age of objects, various types of seismometers for measuring earthquake magnitude, and the measurements used in weather prediction. Directions for making measuring devices such as rangefinders, sextants, and barometers are included.

Mott-Smith, Geoffrey. *Mathematical Puzzles for Beginners and Enthusiasts.* Dover, 1954, 248 pp., paper, $1.75. Grades 7-8.

Puzzles requiring the use of mental arithmetic, plane figures, simple algebra, digits and integers, permutations and combinations, and probability. Solutions included.

Muir, Jane. *Of Men and Numbers.* Dodd, 1961, 249 pp., $4.00. Grades 7-8.

Brief biographical sketches of twelve great mathematicians, emphasizing their contributions to the development of mathematical thought as well as their human foibles and virtues. Portrayed are Pythagoras, Euclid, Archimedes, Cardano, Descartes, Pascal, Newton, Euler, Gauss, Lobatchevski, Galois, and Cantor.

Murray, William D., and Rigney, Francis J. *Paper Folding for Beginners.* See *Primary.*

Navarra, John Gabriel. *Clocks, Calendars, and Carousels.* See *Intermediate.*

Neal, Harry Edward. *Money.* Messner, 1967, 190 pp., $3.95. Grades 7-9.

Information on the history of money, curiosities in coinage and engraving of money, counterfeiting, and investments.

_____. *Mystery of Time.* Messner, 1966, 190 pp., $3.95. Grades 7-9.

Interesting information about concepts of time and efforts to measure it.

Neely, Henry M. *Triangles: Getting Ready for Trigonometry.* Crowell, 1962, 114 pp., $3.50. Grades 7-8.

The history of the relations of triangles to circles, the common uses of triangles, and the possibilities of greater use through trigonometry.

Newell, Homer E., Jr. *Space Book for Young People.* Rev. ed. See *Intermediate.*

Newman, James R., ed. *The World of Mathematics.* 4 vols. Simon, 1956, 2,535 pp., $30.00; paper, $14.95. Grades 7-8.

A small library of the literature of mathematics from A'h-mose' to Albert Einstein. Valuable reference in any junior high school library.

Nourse, Alan E. *So You Want to Be a Scientist.* Harper, 1960, 182 pp., $4.43. Grades 7-8.

Describes in a general way the work and desirable personal and educational qualifications of a scientist. Separate chapter on mathematics.

O'Beirne, T. H. *Puzzles and Paradoxes.* Oxford, 1965, 238 pp., $5.75. Grades 7-9.

A book of puzzles and paradoxes that may challenge the best students.

Oldfield, Ruth L. *The True Story of Albert Einstein, Man of Science.* See *Intermediate.*

Paradis, Adrian A. *The Bulls and the Bears: How the Stock Exchange Works.* See *Intermediate.*

Patton, Price A., and Martha Patton. *Money in Your Pocket, a Management Guide for Young Adults.* McKay, 1959, 181 pp., $3.75. Grade 8.

Discussion of money, its source, use, and influence on everyday living.

Pedoe, Dan. *The Gentle Art of Mathematics.* Drawings by Griselda El Tayeb. Penguin, 1969, $0.95, paper. Grades 7-9.

A discussion of a variety of topics to illustrate what a mathematician does. Includes references to historical and recent developments, unsolved problems, and philosophical foundations.

Perkins, Wilma Lord. *Fannie Farmer Junior Cook Book.* See *Intermediate.*

Piper, Roger. *The Story of Computers.* Harcourt, 1964, 186 pp., $3.95. Grades 7-8.

An account of the history, potentialities, memories, and mechanisms of computers; the varieties of jobs available; training and skills required for the operators.

Ravielli, Anthony. *An Adventure in Geometry.* Viking, 1957, 118 pp., $3.75. Grades 7-8.

Text and vivid drawings reveal the wonder world of geometry as it occurs in nature. The concepts illustrated range from simple ones such as points, lines and angles to more complicated ones such as conic sections, cycloids, and spirals.

_____. *The World Is Round.* See *Intermediate.*

Razzell, Arthur G., and K. G. O. Watts. *Probability: The Science of Chance.* See *Intermediate.*

_____. *This Is 4: The Idea of a Number.* See *Intermediate.*

Reid, Constance. *From Zero to Infinity.* Crowell, 1955, 145 pp., $3.95. Grades 7-8.

This book is concerned specifically with the interesting numbers zero through nine in the operation of arithmetic as well as with their relation to other numbers.

Ripley, Elizabeth. *Leonardo da Vinci.* See *Intermediate.*

Rogers, James T. *The Pantheon Story of Mathematics*. Pantheon, 1966, 128 pp., $6.19. Grades 7-8.

Text and illustrations vividly trace the history of mathematics from finger counting to modern ideas and their uses.

_____. *Story of Mathematics for Young People*. See *Intermediate*.

Rombauer, Irma. *Cookbook for Girls and Boys*. Bobbs, 1952, 243 pp., $4.56. Grades 7-8.

Recipes for both simple and elaborate dishes, with concise definitions of terms and procedures. Preparation requires the use of ideas of measurement, fractions, and ratios.

Rosen, Sidney. *Galileo and the Magic Numbers*. Illustrated by Harve Stein. Little, 1958, 212 pp., $4.50. Grades 7-8.

The life of the great mathematician and scientist shows how the question "why?" can produce important results. A description of Galileo's accomplishments and of his problem-solving approach will prove profitable to the reader.

_____. *The Harmonious World of Johann Kepler*. Illustrated by Rafaello Busoni. Little, 1962, 212 pp., $3.95. Grades 7-8.

The biography of a German scientist, Kepler (1571-1630), who spent a lifetime studying mathematics and science to determine that the courses of the planets are elliptical.

Ross, Frank, Jr. *The World of Engineering*. Lothrop, 1957, 186 pp., $3.50. Grades 7-8.

A history of engineering with the requirements of and preparation for civil, mining, metallurgical, mechanical, electrical, chemical, agricultural, and military engineering provides good guidance material.

Rothman, Joel, and Ruthven Tremain. *Secrets with Ciphers and Codes*. See *Intermediate*.

Ruchlis, Hyman. *Clear Thinking*. Harper, 1962, 307 pp., $4.50. Grades 7-9.

Amusingly illustrated introduction to basic ideas of logic, to common errors in reasoning, and to an analysis of some common forms of advertising.

_____. *Discovering Scientific Method*. Illustrated by Jean Krulis. Harper, 1963, 190 pp., $4.43. Grades 7-9.

Twenty-two "puzzle pictures" encourage the reader to observe carefully, formulate hypotheses, test hypotheses, and reach tentative conclusions about each of the situations pictured.

Ruchlis, Hy, and Jack Engelhardt. *The Story of Mathematics: Introductory Geometry and Algebra.* Harvey, 1958, 150 pp., $4.39. Grades 7-8.

Mathematics is related to the arts, the stars, microscopic plants, and shells, as well as to other aspects of science and to industry.

Rusch, Richard B. *Computers: Their History and How They Work.* Simon, 1969, 160 pp., $4.50. Grades 7-9.

Informative discussion of the function of computers, how they work, and how people are affected by and can control them. Glossary and index included.

_____. *Man's Marvelous Computer: The Next Quarter Century.* Simon, 1970, 128 pp., $4.95. Grades 8-9.

Explains the history and operation of computers, describes some of their current accomplishments, and then predicts some future uses.

Russell, A. H. *Rapid Calculation.* Emerson, 1956, 287 pp., $4.95. Grades 7-9.

Numerous techniques for rapid calculation are given. Exercises and answers are included.

Sanford, Vera. *A Short History of Mathematics.* Houghton, 1930, 402 pp., $8.50. Grades 7-8.

An encyclopedia-type reference book with an index.

Sawyer, W. W. *Mathematician's Delight.* Penguin, 1943, 238 pp., paper, $1.25. Grades 7-8.

Shows how mathematical reasoning resembles "everyday" reasoning and how mathematical ideas are useful in real life. A humorous spirit in the discussion.

_____. *Prelude to Mathematics.* Penguin, 1955, 214 pp., paper, $1.25. Grades 7-8.

Analyzes the most prominent characteristics of mathematicians, such as mental venturesomeness, desire to explore, and interest in pattern, generalization, and unification. Illustrations from arithmetic, algebra, and geometry.

_____. *Vision in Elementary Mathematics.* Penguin, 1964, 246 pp., paper, $1.75. Grades 7-8.

This description of what algebra is about is based on the philosophy that if a person has a clear impression of a problem, he can discover and create solutions for himself.

Schealer, John. *This Way to the Stars.* Dutton, 1957. 181 pp., $3.75. Grades 7-8.

A history of man's ideas about the earth, moon, sun, and other objects in the solar system; culminates in presentation of present knowledge and theories in terms of imaginary trips to each of them.

Scripture, Nicholas E. *Fifty Mathematical Puzzles and Oddities.* See *Intermediate.*

Shaw, Harold A., and Keri Fuge. *The Story of Mathematics.* Illustrated by Paul Sellers. St. Martin's, 1963. 64 pp., $3.95. Grades 7-8.

The story of mathematics as it developed from the needs of man. Short accounts are given of some early mathematicians and of the mathematics developed by them. Excellent illustrations. Quiz and summary at end of each section.

Silverberg, Robert. *Clocks for the Ages—How Scientists Date the Past.* Macmillan, 1971. 238 pp., $5.95. Grades 7-9.

History of the development of techniques of measurement and of the units of measure used by scientists to date ancient artifacts and natural objects such as rocks.

Sitomer, Mindel, and Harry Sitomer. *Circles.* See *Intermediate.*

Smeltzer, Donald. *Man and Number.* Emerson, 1958. 115 pp., $3.95. Grades 7-9.

A history of number, numeration systems, and calculating devices. The final chapter emphasizes why modern notation lends itself to written calculation.

Smith, David Eugene. *History of Mathematics,* Vol. 2. Ginn, 1925. 725 pp., $12.00; Dover, 1925. 725 pp., paper. Grades 7-8.

An encyclopedia-type reference book excellent for superior students.

———. *Number Stories of Long Ago.* See *Intermediate.*

Smith, David Eugene, and Jekuthiel Ginsburg. *Numbers and Numerals.* See *Intermediate.*

Smith, George O. *Mathematics: The Language of Science.* See *Intermediate.*

Soong, Maying. *The Art of Chinese Paper Folding.* See *Intermediate.*

Sootin, Harry. *Isaac Newton.* Messner, 1955. 191 pp., $3.65. Grades 7-8.

A science teacher writes of Newton's importance in mathematics and science and of his method of study.

Srivastava, Jane Jonas. *Computers.* See *Intermediate.*

Steinberg, Fred. *Computers.* Watts, 1969, 96 pp., $3.75. Grades 7-9.

Brief historical background and a discussion of how computers work is followed by excellent discussion of what computers do.

Steinhaus, H. *Mathematical Snapshots.* Oxford, 1969, 266 pp., $7.50. Grades 7-8.

Discussions and illustrations of some applications of mathematics are included. Models of many of the objects described can be made and studied.

Sticker, Henry. *How to Calculate Quickly.* Dover, 1956, 256 pp., paper, $1.25. Grades 7-8.

Explains methods of arithmetic calculation with little or no use of pencil and paper. Contains many examples and exercises for the student.

Stonaker, Frances Benson. *Famous Mathematicians.* See *Intermediate.*

Strader, William W. *Five Little Stories.* NCTM, 1960, 16 pp., $0.90. Grades 7-8.

Five essays discuss calendar revision, multiplication by use of Napier's Bones, the use of the symbol x for a number, a number large beyond normal comprehension, and the cycles of digits in the decimal expansion of the reciprocals of 7 and 17. Historical background and bibliographies are included, and enrichment activities are suggested.

Summers, George J. *New Puzzles in Logical Deduction.* Dover, 1968, 121 pp., $1.25, paper. Grades 7-8.

A collection of 50 puzzle situations in which the clues, both explicit and implicit, provide the basis for solving the puzzle by logical deduction. A few are of the type where a digit must be identified from a computational pattern.

Tani, Yukio. *The Magic Calculator: The Way of Abacus.* See *Intermediate.*

Tannenbaum, Beulah, and Myra Stillman. *Isaac Newton: Pioneer of Space Mathematics.* Illustrated by Gustav Schrotter. McGraw, 1959, 128 pp., $3.00. Grades 7-8.

The life, work, and times of Isaac Newton enlivened by anecdotes about him and his contemporaries highlight his mathematical and scientific achievements.

_____. *Understanding Maps.* See *Intermediate.*

———. *Understanding Time.* McGraw, 1958, 144 pp., $3.00. Grades 7-8.

As the subtitle, "The Science of Clock and Calendars," indicates, this book explains the telling and recording of time and its historic highlights.

Tarshis, Barry. *Barter, Bills and Banks.* See *Intermediate.*

Terry, Leon. *The Mathmen.* See *Intermediate.*

Turnbull, Herbert Westren. *The Great Mathematicians.* New York, 1962, 141 pp., $5.95. Grades 7-8.

A history of mathematics told through the lives of the most influential mathematicians from the ancient Egyptians to the early twentieth century.

Valens, E. G. *Motion.* See *Intermediate.*

———. *The Number of Things: Pythagoras, Geometry and Humming Strings.* See *Intermediate.*

Vergara, William C. *Mathematics in Everyday Things.* Harper, 1959, 301 pp., $5.95. Grades 7-8.

Through questions and answers the author relates the principles of mathematics to everyday objects and occurrences. He also discusses some mathematical concepts that are interesting in their own right. Among the questions are "Which rectangle is the most beautiful?" "Is the number 13 unlucky?" "What is the principle behind whispering galleries?" and "How fast do meteors travel?"

Vorwald, Alan, and Frank Clark. *Computers.* Illustrated by Frank Aleise. McGraw, 1964, 174 pp., $4.95. Grades 7-8.

Computers from sand tables to electronic brains and their uses are discussed in an interesting way. Sections are included on numeration systems and the binary arithmetic of the digital computer.

Walters, Helen B. *Wernher von Braun, Rocket Engineer.* Macmillan, 1964, 185 pp., $4.95. Grades 7-8.

The biography of a rocket engineer who from boyhood was driven by an insatiable curiosity to explore space. His difficulties and successes with mathematics and physics are detailed.

Weyl, Peter. *Men, Ants, and Elephants: Size in the Animal World.* See *Intermediate.*

Wilcox, Louise K., and Gordon E. Burks. *What Is Money?* See *Intermediate.*

Wilkins, H. Percy, and Patrick Moore. *How to Make and Use a Telescope.* Norton, 1956, 195 pp., $5.95. Grades 7-8.

Instructions for constructing a small telescope and using it to make astronomical observations. Mathematics is needed for construction and use.

Willerding, Margaret F. *From Fingers to Computers.* See *Intermediate.*

Wylie, C. R. *101 Puzzles in Thought and Logic.* Dover, 1957, 128 pp., paper, $1.25. Grades 7-8.

Puzzles in this book require the use of problem-solving methods in nonmathematical situations.

Yoshino, Y. *The Japanese Abacus Explained.* Dover, 1937, 240 pp., paper, $2.00. Grades 7-8.

A description of how to calculate with the Japanese abacus. With exercises.

Zaffchy, Harry. *Let's Make a Lot of Things.* See *Intermediate.*

———. *Let's Make Something.* See *Intermediate.*

———. *Wheel of Time.* See *Intermediate.*

Zim, Herbert S. *Codes and Secret Writing.* See *Intermediate.*

———. *The Sun.* See *Intermediate.*

Directory of Publishers

Abelard. Abelard-Schuman Ltd., 6 W. 57th St., New York, N.Y. 10019.

Abingdon. Abingdon Press, 201 Eighth Ave. South, Nashville, Tenn. 37203.

Arco. Arco Publishing Co., Inc., 219 Park Ave. South, New York, N.Y. 10003.

Atheneum. Atheneum Publishers, 162 E. 38th St., New York, N.Y. 10016.

A-W. Addison-Wesley Publishing Co., Inc., Reading, Pa. 01867.

Barnes. A. S. Barnes & Co., Inc., Box 421, Cranbury, N.J. 08512.

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Bradbury. Bradbury Press, Inc., 2 Overhill Rd., Scarsdale, N.Y. 10583.

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Coward. Coward-McCann, Inc., 200 Madison Ave., New York, N.Y. 10016.

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Crown. Crown Publishers, Inc., 419 Park Ave. South, New York, N.Y. 10016.

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Dial. The Dial Press, Inc., 750 Third Ave., New York, N.Y. 10017.

Dodd. Dodd, Mead & Co., 79 Madison Ave., New York, N.Y. 10016.

Doubleday. Doubleday & Co., Inc., 501 Franklin Ave., Garden City, N.Y. 11530.

Dover. Dover Publications, Inc., 180 Varick St., New York, N.Y. 10014.

Dutton. E. P. Dutton & Co., Inc., 201 Park Ave. South, New York, N.Y. 10003.

Emerson. Emerson Books, Inc., 251 W. 19th St., New York, N.Y. 10011.

Evans. M. Evans & Co., East Washington Sq., Philadelphia, Pa. 19105.

Fawcett. Fawcett Publications, Inc., Fawcett Pl., Greenwich, Conn. 06830.

Follett. Follett Publishing Co., 1010 W. Washington Blvd., Chicago, Ill. 60607.

Franklin. Franklin Publications, Inc. Send order to Lyons & Carnahan.

Ginn. Ginn & Co., Statler Bldg., Back Bay P.O. 191, Boston, Mass. 02117.

Golden. Golden Press, Inc. Send order to 150 Parish Dr., Wayne, N.J. 07470.

Grosset. Grosset & Dunlap, Inc. Send order to 227 E. Center St., Kingsport, Tenn. 37660.

Hale. E. M. Hale and Co., 1201 S. Hastings Way, Eau Claire, Wis. 54701.

Harcourt. Harcourt Brace Jovanovich, Inc., 757 Third Ave., New York, N.Y. 10017.

Harper. Harper & Row, Publishers, 49 E. 33d St., New York, N.Y. 10016.

Hart. Hart Publishing Co., Inc., 74 Fifth Ave., New York, N.Y. 10011.

Harvey. Harvey House, Inc., Publishers, Irvington-on-Hudson, N.Y. 10533.

Hawthorn. Hawthorn Books, Inc., 70 Fifth Ave., New York, N.Y. 10011.

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Holt. Holt, Rinehart & Winston, Inc., 383 Madison Ave., New York, N.Y. 10017.

Houghton. Houghton Mifflin Co. Send order to Wayside Rd., Burlington, Mass. 01803.

Japan. Japan Publications Trading Co., 11-13 Center St., Rutland, Vt. 05701.

Knopf. Alfred A. Knopf, Inc. Send order to 33 W. 60th St., New York, N.Y. 10023.

Lieber. Lieber Publisher, c/o Galois Institute of Mathematics and Art, 624A Third St., Brooklyn, N.Y. 11215.

Lippincott. J. B. Lippincott Co., East Washington Sq., Philadelphia, Pa. 19105.

Little. Little, Brown & Co., 34 Beacon St., Boston, Mass. 02106.

Lothrop. Lothrop, Lee & Shepard Co., 419 Park Ave. South, New York, N.Y. 10016.

Lyons. Lyons & Carnahan, 407 E. 25th St., Chicago, Ill. 60610.

McBride. McBride Books, 60 Laight St., New York, N.Y. 10013.

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Macrae. Macrae Smith Co., 225 S. 15th St., Philadelphia, Pa. 19102.

Messner. Julian Messner, 1 W. 39th St., New York, N.Y. 10018.

Morrow. William Morrow & Co., Inc. Send order to 788 Bloomfield Ave., Clifton, N.J. 07012.

NCTM. National Council of Teachers of Mathematics, 1201 16th St., N.W., Washington, D.C. 20036.

New American. New American Library, 1301 Avenue of the Americas, New York, N.Y. 10019.

New York. New York University Press, 32 Washington Pl., New York, N.Y. 10003.

Norton. W. W. Norton & Co., Inc., 55 Fifth Ave., New York, N.Y. 10003.

Oxford. Oxford University Press, Inc. Send order to 16-00 Pollitt Dr., Fair Lawn, N.J. 07410.

Pantheon. Pantheon Books, Inc., 33 W. 60th St., New York, N.Y. 10023.

Penguin. Penguin Books, Inc., 3300 Clipper Mill Rd., Baltimore, Md. 21211.

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Prentice. Prentice-Hall, Inc., Rte. 9W, Englewood Cliffs, N.J. 07632.

Putnam. G. P. Putnam's Sons, 200 Madison Ave., New York, N.Y. 10016.

Rand. Rand McNally & Co. Send order to Box 7600, Chicago, Ill. 60680.

Random. Random House, Inc. Send order to 30 W. 60th St., New York, N.Y. 10023.

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St. Martin's. St. Martin's Press, Inc., 175 Fifth Ave., New York, N.Y. 10017.

Scott. William R. Scott, Inc., 333 Avenue of the Americas, New York, N.Y. 10014.

Scribner. Charles Scribner's Sons. Send order to Vreeland Ave., Totowa, N.J. 07512.

Scripta. Scripta Mathematica, Amsterdam Ave. and 186th St., New York, N.Y. 10033.

Silver. Silver Burdett Co., 250 James St., Morristown, N.J. 07960.

Simon. Simon & Schuster, Inc., 630 Fifth Ave., New York, N.Y. 10020.

Southern. Southern Illinois University Press, Carbondale, Ill. 62901.

Steck. Steck-Vaughn Co., Box 2028, Austin, Tex. 78767.

Sterling. Sterling Publishing Co., Inc., 419 Park Ave. South, New York, N.Y. 10016.

Time. Time-Life Science Library. Send order to Silver Burdett Co.

Tuttle. Charles E. Tuttle Co., 28-30 S. Main St., Rutland, Vt. 05701.

University of Chicago. University of Chicago Press, 5750 Ellis Ave., Chicago, Ill. 60637.

Vanguard. Vanguard Press, 424 Madison Ave., New York, N.Y. 10017.

Van Nostrand. D. Van Nostrand Co., 120 Alexander St., Princeton, N.J. 08540.

Vintage. Vintage Books. Order from Random.

Viking. Viking Press, 625 Madison Ave., New York, N.Y. 10022.

Walck. Henry Z. Walck, 19 Union Sq. West, New York, N.Y. 10003.

Walker. Frank R. Walker Co., 5030 N. Harlem Ave., Chicago, Ill. 60656.

Watts. Franklin Watts, 575 Lexington Ave., New York, N.Y. 10022.

Whitman. Albert Whitman & Co., 560 W. Lake St., Chicago, Ill. 60606.